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ENVIRONMENTAL ANALYSIS RECORD

TRACY – OREANA
230-345 KV
TRANSMISSION LINE
RIGHT-OF-WAY

N-7639

FINAL

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.E37
T733
1976

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
NEVADA STATE OFFICE

FEBRUARY 1976

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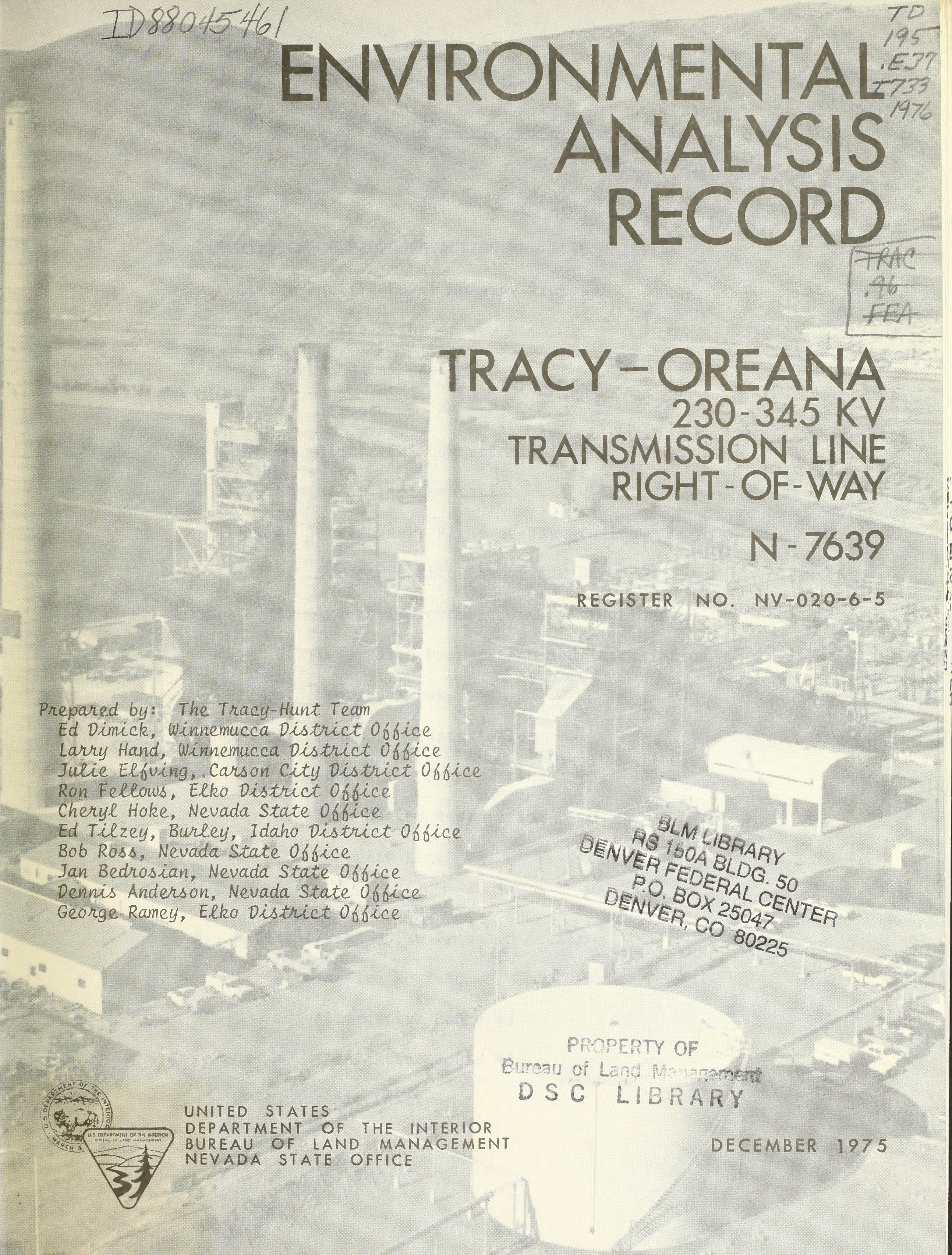

ENVIRONMENTAL ANALYSIS RECORD

~~TRAC~~
~~.96~~
~~FEA~~

TRACY – OREANA

230-345 KV TRANSMISSION LINE RIGHT-OF-WAY

N-7639

REGISTER NO. NV-020-6-5

Prepared by: The Tracy-Hunt Team
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NEVADA STATE OFFICE

DECEMBER 1975

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INTRODUCTION

Under the right-of-way authority of the Act of March 4, 1911, (36 Statute 1253; U. S. Code 961), the Sierra Pacific Power Co. filed an application on Jan. 31, 1975, with the Bureau of Land Management (BLM) for a right-of-way to construct a 230 kilovolt (230,000 volts) power transmission line which may be modified to 345 kilovolts at a later date. The proposed line would span about 90 miles between two of the company's power stations. Since it would also cross Indian lands, an application for a right-of-way over the Pyramid Indian Reservation was filed with the Bureau of Indian Affairs on Aug. 2, 1974.

The proposed 140-foot wide right-of-way begins at the company's Tracy power station, located on the Truckee River 11 miles west of Wadsworth, Nevada, and terminates 90 miles to the northeast at the Oreana substation, located 12 miles north of Lovelock, Nevada. When completed, this line would be temporarily energized at 120 kilovolts to serve the immediate energy demands in the Lovelock-Winnemucca areas.

As proposed, this power line will be: (1) constructed utilizing towers, insulator strings, and conductors which can be converted to carry a 345 kilovolt load in the future; (2) located adjacent to existing rights-of-way including a 120 kilovolt (KV) power line, a natural gas line, and Interstate Highway 80; (3) located within an area already affected by mining, small distribution lines, county roads, and other land uses; (4) an integral

part of an energy transmission connection system to Utah Power and Light Co. through Idaho Power Co. This system depends upon subsequent analysis of the environmental impacts, approval of the right-of-way application, and completion of the proposed power line segment between the Oreana substation and the Hunt substation, Idaho; and (5) one, of possibly two, medium-capacity power transmission lines within a right-of-way corridor to support the planned North Valmy power generation plants proposed for completion during the early 1980's near Battle Mountain.

According to Sierra Pacific (refer to "Tracy-Hunt Transmission Project, U.P.&L. Intertie No. 2, Environmental Analysis," prepared by SE&A Engineers and Planners for Sierra Pacific, April 1975), the purpose of the proposed power line is: (1) to provide additional power to satisfy the increased agricultural and mining demands in the Lovelock-Winnemucca areas; (2) satisfy the obligations of certificates of convenience and necessity granted by the State of Nevada; and (3) in the future, to provide a connection system through Idaho Power for reliable power for the Reno-Sparks area upon the approval and completion of the Oreana, Nevada, to Hunt, Idaho, power line.

To explain the latter point, Sierra Pacific has already contracted to purchase 200 megawatts (200,000,000 watts) of power from Utah Power and Light Co. About 50 megawatts now flows over the Sigard, Utah, to Ft. Churchill, Nevada, 230 kilovolt power line, energized on Aug. 6, 1975. The remaining 150 megawatts will be received at the Hunt, Idaho, substation for transmission to Sierra Pacific Power Nevada facilities.

Sierra Pacific Power states it can meet the projected power demands

created by agriculture development in the Lovelock District for the 1976 peak season provided the Tracy to Oreana power line is completed by the spring of 1976. The power demand of the district is increasing at a rate of about 10 per cent per year. Present capacity is 51 megawatts (32 megawatts in transmission capacity and 19 megawatts in generation capacity at Winnemucca and Battle Mountain). The company's projected needs for the future are:

Year	Current Service Capacity	Projected Demand	Shortage
1975	51 megawatts (MW)	59 MW	8 MW
1976	83* MW	63 MW	none
1977	83 MW	67 MW	none
1978	83 MW	72 MW	none

*Includes proposed Tracy to Oreana 120 kilovolt line addition

SUMMARY

The Bureau of Land Management (BLM) is currently considering the following actions proposed by the Sierra Pacific Power Company, a Nevada based utility:

1. Construction of a 230 kilovolt (KV) transmission line extending 90 miles between the Tracy and Oreana, Nevada substations. This project is commonly called the Tracy-Oreana line.

2. Continuation of the above transmission line from the Oreana substation to the Hunt, Idaho substation, a distance of approximately 285 miles. This project is commonly called the Oreana-Hunt line.

3. Construction of a 500 megawatt coal-fired power generating station near Valmy, Nevada. As proposed, this power plant would be adjacent to the Oreana-Hunt transmission line and would require a separate transmission system. One part of the plant's transmission system would extend to the Reno area and would parallel portions of the Oreana-Hunt and Tracy-Oreana transmission lines. The attached schematic map shows the relationship of these proposed projects and their relative location.

In order to complete the necessary environmental analyses for these separate but related projects, it has been determined that an environmental analysis record (EAR) will be prepared for the Tracy-Oreana line, while full environmental impact statements (EISs) will be prepared for the Oreana-Hunt line and for the Valmy generating station.

This document represents the first of these required analyses, and addresses the impacts resulting from construction and operation of the Tracy-Oreana transmission line.

Rationale

While these projects are related, and if completed, will form an integral part of the applicant's total system, they are being evaluated separately for the following reasons:

1. The applicant has identified a current need for delivery of additional power to the Oreana substation to meet increased agricultural irrigation demands in the Lovelock area.

2. While related in function and location, the projects are separate in time and are proposed to be developed independently. The proposals could in fact stand as independent projects should either or both of the others not be completed.

3. Based on public review and reaction to this analysis approach the Tracy-Oreana project can be reevaluated as either a separate EIS or as a component of a total Tracy-Hunt EIS.

4. The proposed alignment between Tracy, Oreana and the Valmy plant site will be evaluated as a possible corridor to accommodate both the Tracy-Hunt line and one of the lines from the Valmy power plant.

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

SECTION I

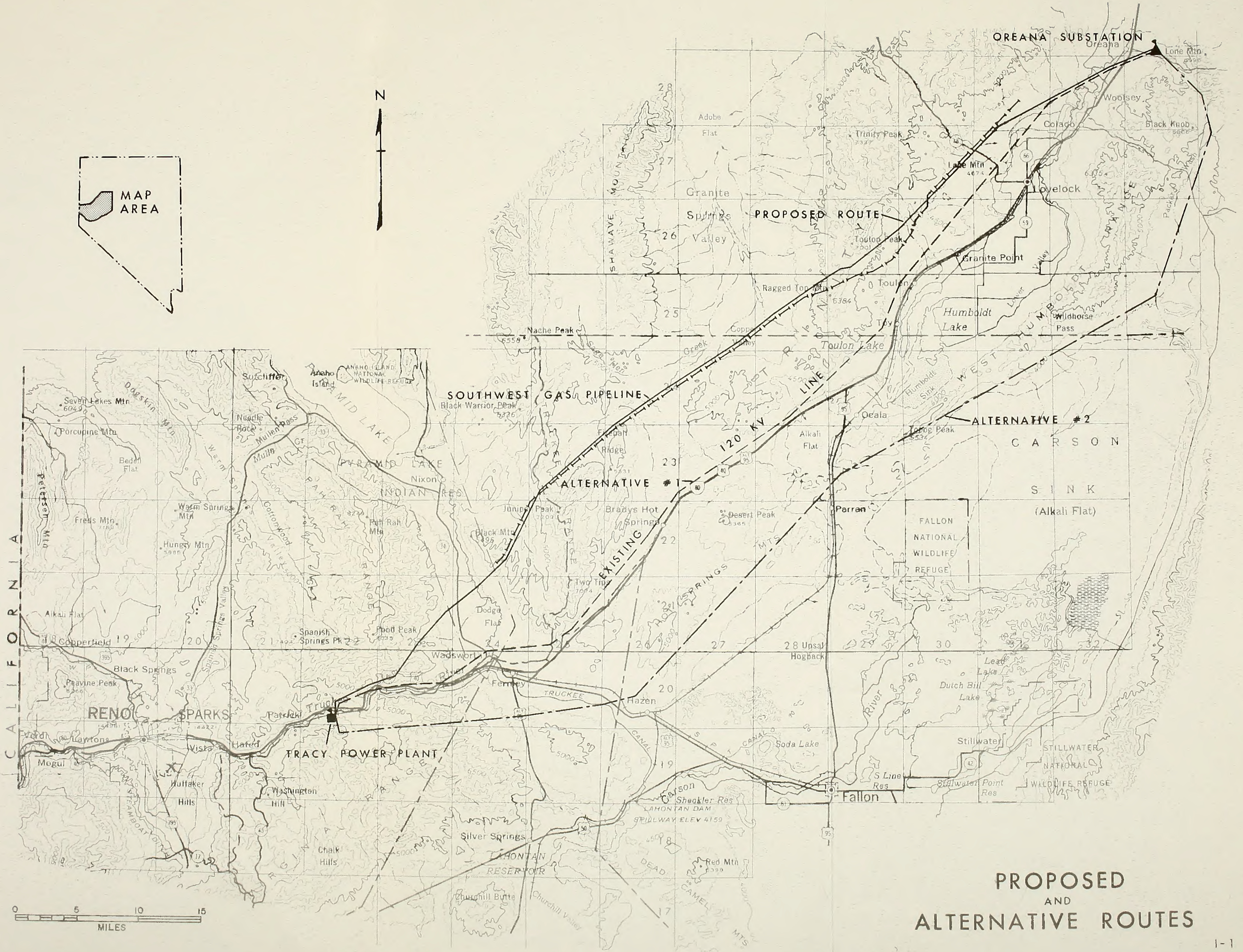
I. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

A. SIERRA PACIFIC POWER CO. PROPOSAL

1. Power line Right-of-Way

Following an environmental constraint study, Sierra Pacific selected what it considered to be the best route and filed an application for the right-of-way shown on Map No. I-1.

The proposed Tracy to Oreana power line is described as follows: Originating at the Tracy generating station, the line will extend in a northerly direction crossing the Truckee River and Interstate Highway 80. Two miles north of the generating station, it turns northeast for 8 miles and crosses the southern part of the Pah-Rah Range, Pyramid Lake Indian Reservation, State Highway 34, and the Truckee River. The line will then pass over the Truckee Range, through Copper Valley, parallel (about 1000 feet away) a Southwest Gas. Co. natural gas transmission line for about 50 miles, and continue through a pass in the southern part of the Trinity Range south of Toulon Peak. The line will then extend northeast, running approximately parallel to and northwest of Interstate 80 at a separation of from 4 to 6 miles. It crosses State Highway 48 about 2 miles northwest of Lone Mountain. At this point, the line will enter the northwest edge of Upper Valley, north of Lovelock, Nevada, and parallel the slopes of the Trinity Range. About 6 miles northeast of Trinity Canyon, the line will go east for about 5 miles, crossing the main line of the Southern Pacific Railroad, Interstate 80, and the Humboldt River. It will terminate at the Oreana substation.



PROPOSED
AND
ALTERNATIVE ROUTES

An integral part of this project is the proposed 230 kilovolt substation located on Tracy Generation Station complex adjacent to the present substation.

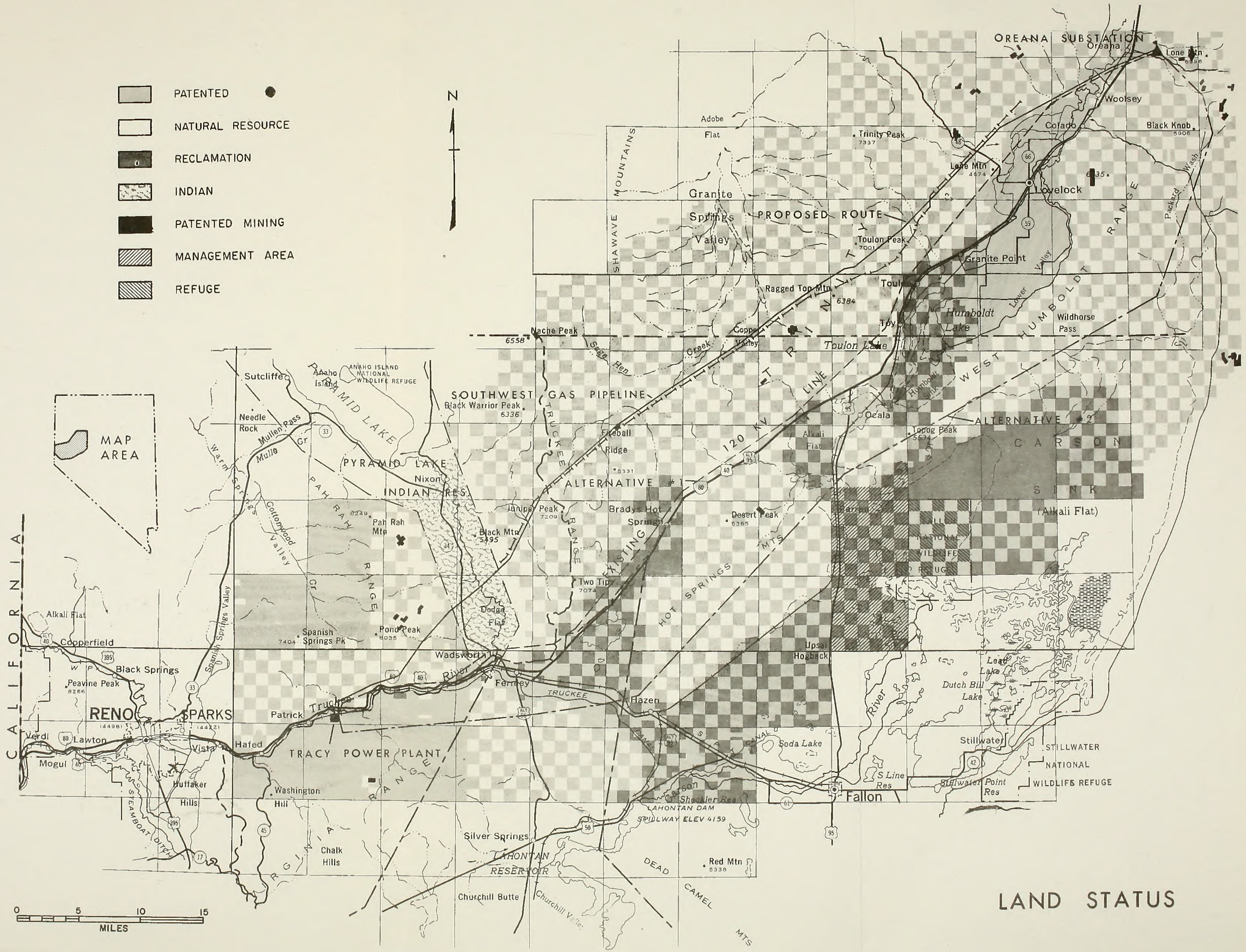
The 140-foot wide right-of-way crosses portions of Churchill, Pershing, and Washoe Counties. (Refer to Tables I-1 and I-2). The proposed route lies generally within a checkerboard land pattern created by the Central Pacific Railroad land grant. Of the total 90 mile length, the right-of-way crosses about 36.1 miles of national resource lands administered by the BLM; 4.8 miles of the Pyramid Lake Indian Reservation; and 48.5 miles of private land.

2. Power System Design

a. Structures

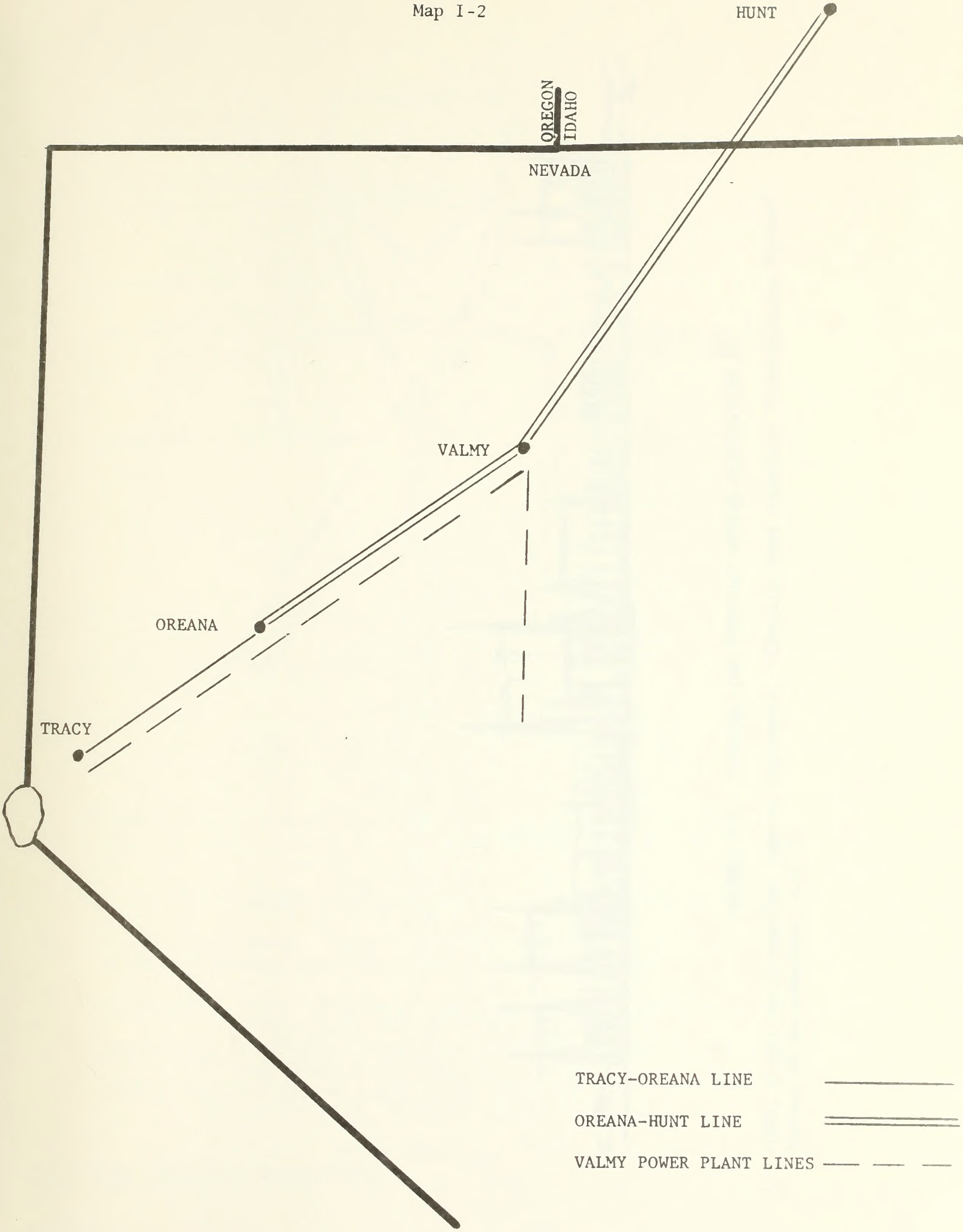
The 230 kilovolt substation at Tracy will measure about 400 square feet. It will be enclosed by a chain link fence and will be designed as a "low profile" structure, meaning it will be less than 30 feet high. (Refer to Figure I-1).

Supporting towers along the line, consisting primarily of the Guyed Delta Design (Refer to Figure I-2 for tower design details), will be spaced, on the average, 1,200 feet apart with individual spans ranging from 600 to 2,500 feet. These will vary from 60 feet tall to 121 feet, depending on terrain. The conductor can be no less than 32 feet from the ground; therefore, exact height of the towers will be governed by the safety requirements for conductor clearance. A few self-supporting, cross-braced, "H" frame towers may be used in rugged terrain or in other appropriate areas such as agricultural


PATENTED
NATURAL RESOURCE
RECLAMATION
INDIAN
PATENTED MINING
MANAGEMENT AREA
REFUGE
N
MAP AREA
OREANA SUBSTATION
Oreana
Lone Mtn
Woolsey
Colado
Black Knob
Adobe Flat
Trinity Peak 7337
Lone Mtn 4674
Lovelock
Granite Springs Valley
SHAWAVE MOUNTAINS
PROPOSED ROUTE
Toulon Peak 7001
Granite Point
Toulon
Ragged Top Mtn 6384
Humboldt Lake
Toy
Lower Valley
WEST HUMBOLDT RANGE
Wildhorse Pass
Packard Wash
Nache Peak 6558
Copper Valley
Sage Hen Creek
Toulon Lake
TRINITY
120 KV LINE
SOUTHWEST GAS PIPELINE
Black Warrior Peak 6336
Humboldt Sink
Ocala
Alkali Flat
Fireball Ridge
Toreg Peak
ALTERNATIVE #2
CARSON SINK
(Alkali Flat)
ALTERNATIVE #1
Juniper Peak 7209
Bradys Hot Springs
Desert Peak 5365
EXISTING
TRUCKEE RANGE
HOT SPRINGS MTS
Two Tips 7074
FALLON NATIONAL WILDLIFE REFUGE
Upsal Hogback
Sutcliffe
Anaho Island
ANAHO ISLAND NATIONAL WILDLIFE REFUGE
PYRAMID LAKE
Needle Rock
Mullen Pass
Mullen Cr
Warm Springs
PYRAMID LAKE INDIAN RES
Nixon
PAH RAH RANGE
Pah Rah Mtn
Black Mtn 5495
Cottonwood Valley
Dodge Flat
Spanish Springs Valley
Spanish Springs Pk 7404
Pond Peak 8035
Alkali Flat
Copperfield
Black Springs
Peavine Peak 8266
CALIFORNIA
RENO
SPARKS
Verdi
Lawton
Mogul
Vista
Huffaker Hills
Patrick
Truckee River
Wadsworth
Fernley
Hafed
TRACY POWER PLANT
Washington Hill
VIRGINIA RANGE
Hazen
TRUCKEE CANAL
Soda Lake
Carson
Sheckler Res
LAHONTAN DAM
SPILLWAY ELEV 4159
Fallon
S Line Res
Stillwater
Stillwater Point Res
Lead Lake
Dutch Bill Lake
STILLWATER NATIONAL WILDLIFE REFUGE
Silver Springs
LAHONTAN RESERVOIR
Churchill Butte
Churchill Valley
DEAD CAMEL MTS
Red Mtn 5338
Chalk Hills
STEAMBOAT DITCH
0 5 10 15
MILES

LAND STATUS

Map I-2


HUNT
OREGON
IDAHO
NEVADA
VALMY
OREANA
TRACY
TRACY-OREANA LINE
OREANA-HUNT LINE
VALMY POWER PLANT LINES

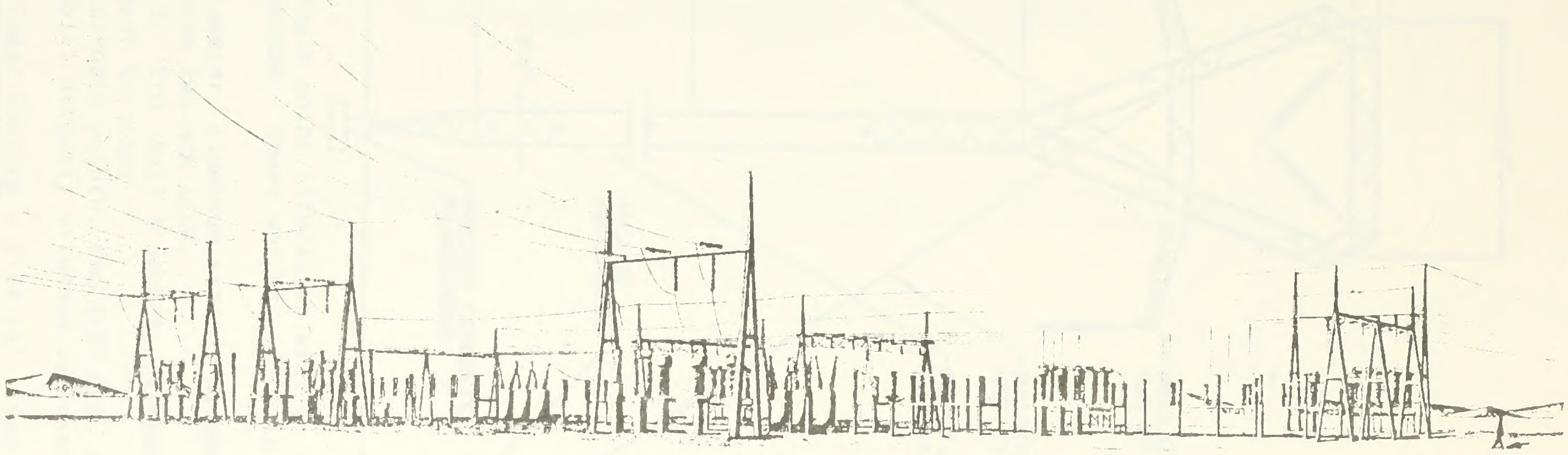
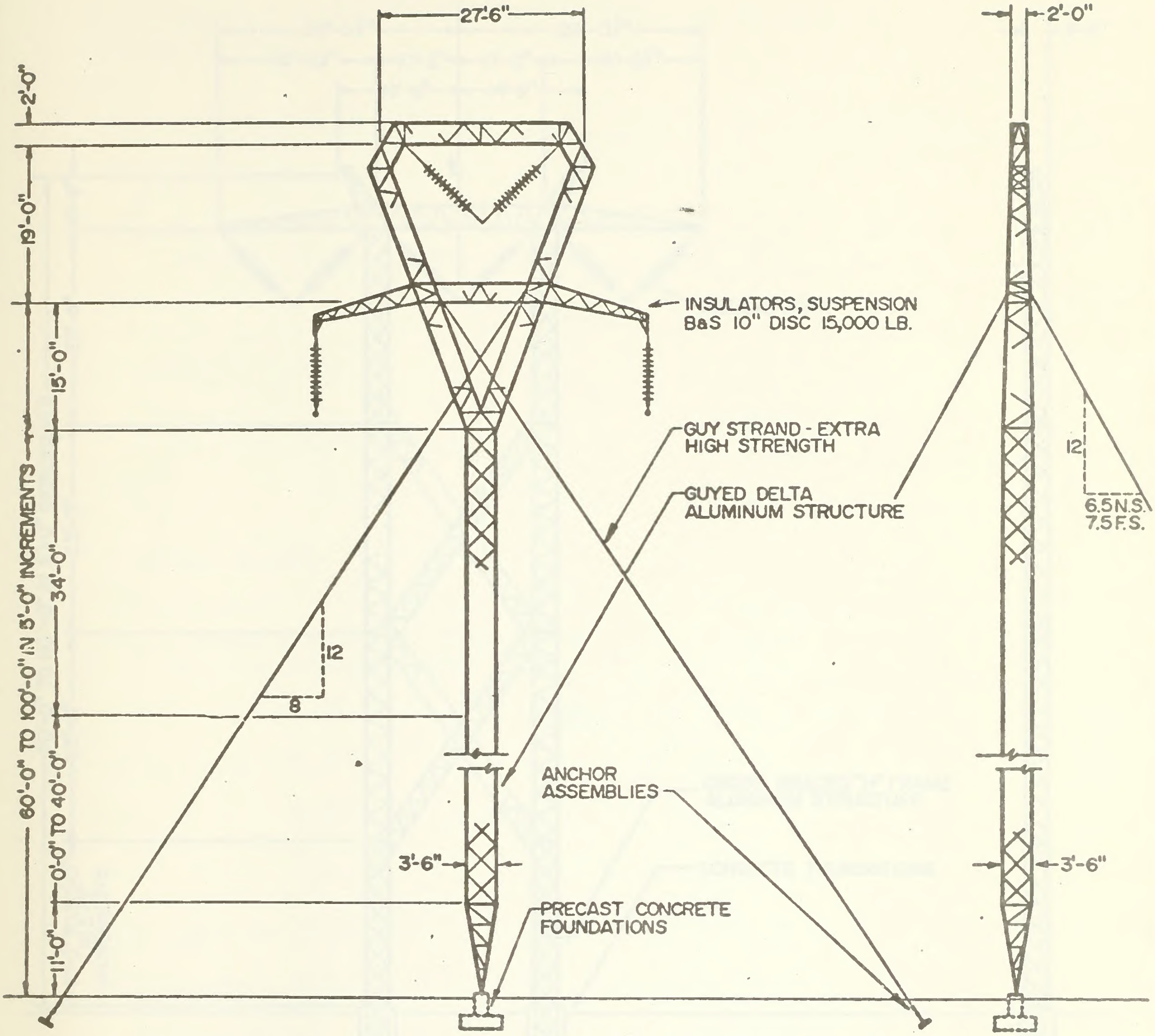


FIGURE I-1 - TYPICAL LOW PROFILE DESIGN SUBSTATION 1/

1/ USDI, Final Environmental Impact Statement, "Granite Reef Aqueduct Transmission System" Bureau of Reclamation, 8/4/75


27'-6"
2'-0"
19'-0"
15'-0"
34'-0"
60'-0" TO 100'-0" IN 5'-0" INCREMENTS
0'-0" TO 40'-0"
11'-0"
INSULATORS, SUSPENSION B&S 10" DISC 15,000 LB.
GUY STRAND - EXTRA HIGH STRENGTH
GUYED DELTA ALUMINUM STRUCTURE
12
8
ANCHOR ASSEMBLIES
3'-6"
PRECAST CONCRETE FOUNDATIONS
2'-0"
12
6.5 N.S.
7.5 F.S.
3'-6"

NOTE: Typical line tower. Angle point structures will be of the same design, but of heavier structural aluminum. Tower weight: 2900 lbs.

Conductors: 1.063" diameter, aluminum strands wrapped around a high strength steel core. Class 795-MCM ACSR.

Insulators: Class 52-3. Std. Ball & Socket, Fifteen to the string, 10" diameter and sky gray in color.

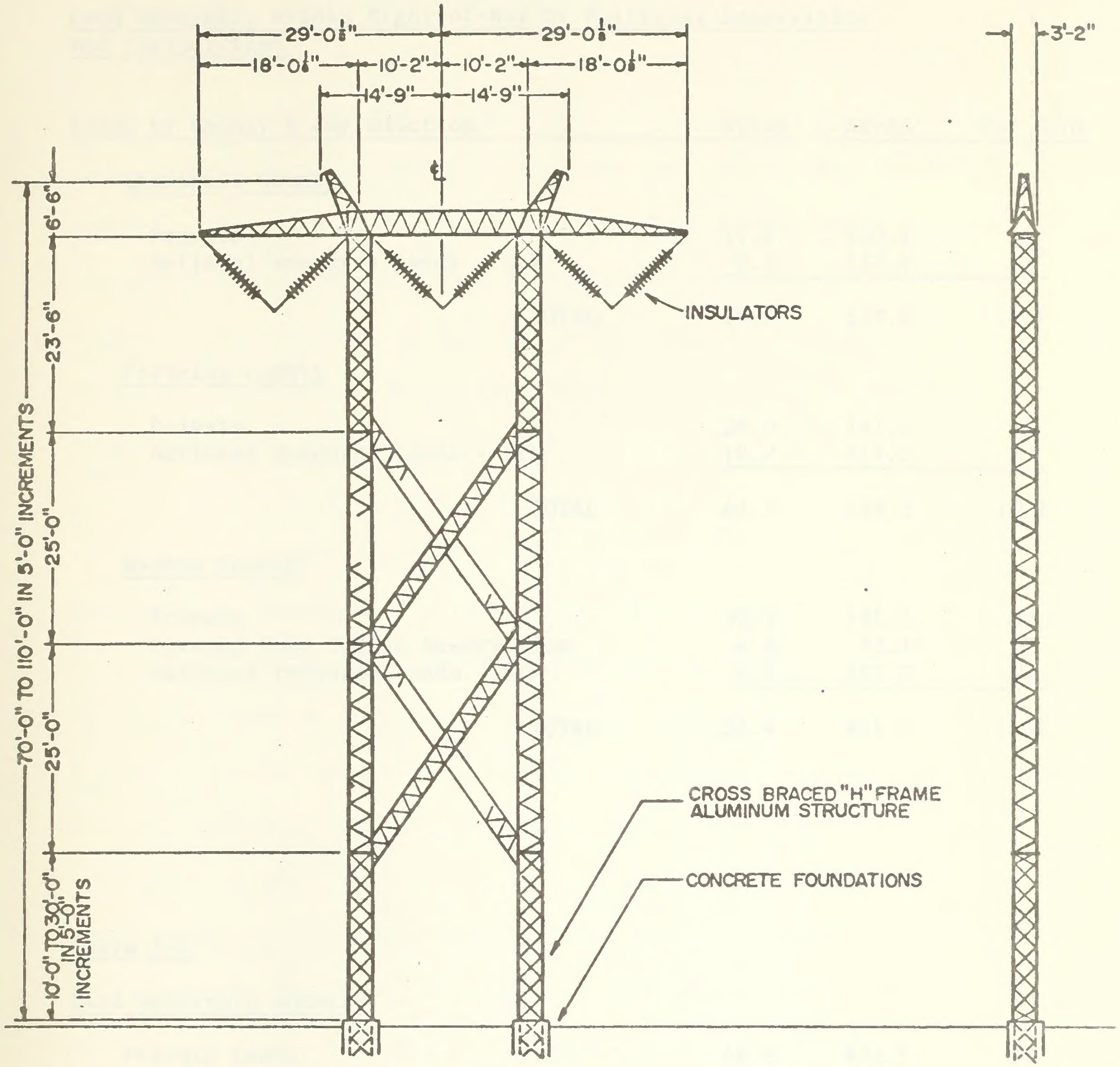
Shield Wires: At top triangle points, two 3/8" dia. extra high strength galvanized steel cable, directly attached to towers for lightning protection.

Tower Footing - 4'x4'x4' Set below frost line.

GUYED DELTA TOWER

FIGURE I-2

S E & A
ENGINEERS
PLANNERS
SPARKS, NV


29'-0⅛"
29'-0⅛"
18'-0⅛"
10'-2"
10'-2"
18'-0⅛"
14'-9"
14'-9"
℄
3'-2"
6'-6"
23'-6"
25'-0"
25'-0"
70'-0" TO 110'-0" IN 5'-0" INCREMENTS
10'-0" TO 30'-0" IN 5'-0" INCREMENTS
INSULATORS
CROSS BRACED "H" FRAME ALUMINUM STRUCTURE
CONCRETE FOUNDATIONS

CROSS BRACED "H" FRAME TOWER

FIGURE I- 3

S E & A
ENGINEERS
PLANNERS
SPARKS, NV.

Table I-1

Land Ownership within Right-of-Way by Political Subdivision and Jurisdiction

Lands by County & Jurisdiction	Miles	Acres	Per Cent
Churchill County			
Private	11.8	200.1	59
National resource lands - BLM	8.1	137.4	41
TOTAL	19.9	337.5	100%
Pershing County			
Private	26.0	441.0	60
National resource lands - BLM	18.7	317.2	40
TOTAL	44.7	758.2	100%
Washoe County			
Private	10.7	181.4	45
Pyramid Lake Indian Reservation	4.8	72.4*	17
National resource lands - BLM	9.3	157.7	38
TOTAL	24.8	411.5	100%

Table I-2

Land Ownership Summary

Private Lands	48.5	822.5	55
Pyramid Lake Indian Reservation	4.8	72.4*	5
National resource lands	36.1	612.3	40
TOTAL	89.4	1,507.2	100%

Note: The distances and acreages presented for the proposed line will double with construction of a similar transmission line within the right-of-way corridor.

* Less than the basic 140-foot right-of-way width.

lands and, when equipped with guys, as an end tower location at a substation. (Refer to Figure I-3 for the "H" frame tower.)

"Tower foundations are expected to be steel reinforced concrete slabs, either precast and placed in holes below the local frost line, or cast in place when the structure can rest directly on bedrock. The guy anchors required by the Guyed Delta Towers would consist of either imbedded dead-man (plate or cone-shaped) anchors buried in the ground or anchor rods placed in holes drilled into rock. Use of the anchor type would be influenced by the local subsurface geology." 1/

b. Electrical Characteristics

"Initially, the proposed transmission line would be designed and constructed to operate at a nominal voltage of 230 kilovolts phase to phase, a maximum voltage of 242 kilovolts phase to phase, a nominal voltage of 133 kilovolts phase to ground, and a maximum voltage of 140 kilovolts phase to ground. It would also have the capability of being converted to a nominal voltage of 345 kilovolts phase to phase, a maximum voltage of 362 kilovolts phase to phase, a nominal voltage of 199 kilovolts phase to ground, and a maximum voltage of 209 kilovolts phase to ground by the addition of a second conductor per phase forming a two conductor bundle." 1/

1/ SE&A Engineers and Planners, "Tracy-Hunt Transmission Project, U.P.&L. Intertie No. 2, Environmental Analysis," prepared for Sierra Pacific, April 1975.

The transmission line will consist of three aluminum cables about one inch in diamater, and will be designed to operate as a single circuit, three-phase alternating current of 230 kilovolts. The line will be connected to the 120 kilovolt stations at Tracy and Oreana and temporarily carry this load for use in the Lovelock-Winnemucca areas. Conversion to the future use load of 345 kilovolts can be accomplished by attaching another wire to the existing cables by utilizing short (about 14-inch) insulated spacer bars.

The substation will contain equipment necessary for the control, electrical compensation, and the distribution of electrical power. The Tracy terminal substation will contain a single 230 kilovolt terminal with necessary circuit breakers, shunt reactors, series capacitors, transformers and related control, metering, and communication facilities. The substation will maintain communication with control equipment at other substations via existing microwave and telephone facilities.

3. Stages of Implementation

(See Table I-3 for summary and comparison of area requirements for all routes.)

a. Preliminary Right-of-Way Studies

Following contract negotiations to secure a source of power, and the company's environmental constraint study to select a practical corridor, preliminary field surveys were conducted to lay out the centerline, locate primary engineering control points and section corners, and conduct an archaeological survey along the proposed alignment. Field operations were conducted utilizing two

TABLE I-2

SUMMARY OF CONSTRUCTION REQUIREMENTS

	Proposed Right-of-Way	Alternative Route 1	Alternative Route 2
Total Miles of Right-of-Way (R/W)	89.4 miles	93 miles	99-1/2 miles
Total R/W Area (140 feet wide)	1507 acres	1577 acres	1688 acres
- Disturbance Areas -			
Access Needs (Construction Estimated)			
Along R/W in rough terrain	6 mi./21 acres	3 mi./15 acres	6 mi./21 acres
To Tower Sites and equipment pads	19 acres	6 acres	12 acres
Between Towers along centerline	109 acres	111 acres	119 acres
Site Construction Disturbance			
Tower Sites	6-1/2 acres	7 acres	7-1/2 acres
4 Storage yards	60 acres	60 acres	60 acres
Substation	3-2/3 acres	3-2/3 acres	3-2/3 acres
Tension Stations	1/4 acre	1/4 acre	1/4 acre
Total Disturbance Area:	219 acres	203 acres	223 acres
(With Helicopter Installation)	182 acres	164 acres	193 acres

The above disturbance areas have been estimated, based upon the applicant's environmental analysis report and information gained from discussions concerning special actions during construction.

Note: The distances and acreages presented for the proposed action will increase significantly with construction of a similar transmission line within the right-of-way corridor.

pickup trucks and a helicopter. This action resulted in minimal disturbance to the proposed route and surrounding areas. The only long-term aspect will be the plastic strips for aerial photography, located at approximately 1 to 2 mile intervals along the proposed centerline.

b. Structure Site Layout and Survey

Once a right-of-way is authorized, the company will refine the preliminary study. It plans to employ small survey crews to locate tower sites along the approved route. Also, there may be additional site visits for archaeological salvage purposes or tower site relocation to reduce conflict with other land uses. Following the final survey, engineering design for the sites will be completed to allow planning for tower height, type of tower footing, guy installations, etc.

c. Access Improvement or Construction

One criterion in the company's selection of the proposed route was the availability of adequate access adjacent to, or in close proximity of, the route. Because of this, a maximum of 6 miles of access construction will be required in roadless, rough terrain areas. In general, roads within the vicinity of the line are in acceptable condition and require only minimal maintenance for use.

d. Tower Site Preparation and Installation

During the tower installation phase, a small pickup, an air compressor and a backhoe machine or auger truck, either wheeled or track-driven, will usually be the only equipment used at the tower site to install the tower footing and guy anchors. Within deep soil areas, the guy anchors may be bored into place. Where terrain requirements indicate

tower footings should be cast in place, 3- to 5-yard cement trucks will service the tower site.

Where terrain is steep, access spurs and equipment pads will be necessary to afford safe operation of equipment during tower site preparation and subsequent construction.

Components will be delivered to the tower site for construction by a small skilled crew. This will involve two pickup trucks and a medium-sized boom-equipped truck, or tracked type vehicle.

This crew will erect, level, plumb (make vertical), and set the tower in its permanent location. In the case of the cross-braced "H" frame tower, the crew will require a concrete truck for poured in place footings and will also backfill and pack the soil around each tower. The operations will require a small crew using a mobile crane and two or three pickup trucks. For the guyed tower, the crew will also use a compressor, tampers (a soil compacting machine), and a small end-loading tractor.

> "Towers can be erected by using a helicopter. The normal procedure when utilizing helicopters is to establish staging areas along the line route at about 10-mile intervals. The framing material for 10 miles of line is then delivered to the staging area and towers are assembled by the framing crews. Each tower is then transported to its individual site by the helicopter where a ground crew of 10 to 15 men install it at its permanent location. The ground crew will use from three to five pickup trucks for transportation. [1]

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[1] SE&A Engineers and Planners, "Tracy-Hunt Transmission Project, U.P.&L. Intertie No. 2, Environmental Analysis," prepared for Sierra Pacific, April 1975.

This method eliminates the necessity of delivering the tower components and some construction equipment to each site and assembling a tower at each site. Therefore, it reduces the amount of on-site construction activity. However, this method does not eliminate the necessity for providing access to each tower site for other construction operations and does require staging areas at 10-mile intervals along the route. The method also creates an element of risk (safety of working crew) not associated with normal ground construction procedures." 1/

e. Storage Yards

There will be material storage yards located about 35 miles apart in the route vicinity. These will be located near paved or high quality dirt roads for transportation requirements and near occupied residences for theft prevention. About 3 to 5 acres will be required at each yard to allow space for materials off-loading, classifying, sorting, storage, loading, and equipment storage. Numerous trips will be necessary to and from these areas and there will be significant equipment activity (primarily forklift and truck) on each site.

Where helicopter installation is used, the staging areas will have about the same activity as the large storage yards, except the site will also serve as a tower assembly area. Completed towers will be air-lifted to the tower location for installation. These staging sites will require about 1 to 3 acres of area for tower assembly and storage, and material storage.

1/ SE&A Engineers and Planners, "Tracy-Hunt Transmission Project, U.P.&L. Intertie No. 2, Environmental Analysis," prepared for Sierra Pacific, April 1975.

f. Conductor Installation

"Conductors are installed with a tensioner and a puller. The tensioner consists of a large trailer loaded with three reels of conductor and a braking device. The puller is a large machine, powered by gas or diesel fuel, with three permanent reels containing about 2 miles of steel wire rope on each reel. The puller is located about 2 miles ahead of the tensioner and in line with the towers.

"To install the conductor, the ends of the wire rope from the puller are pulled towards the tensioner 2 miles away and threaded through sheaves (pulley-like mechanisms) installed on each tower. A vehicle traveling the right-of-way centerline is needed to provide the power because the three steel-wire ropes are too heavy to be pulled out for 2 miles by manpower alone, although in some locations manpower may be used over short distances. Each of the three reels of conductor is attached to a reel of steel wire rope and as the pulling machine begins to reel in the wire, it also installs the conductor. This operation is repeated along the route at intervals of about 2 miles for the entire length of the line. The conductor-stringing operation usually requires a crew of 10 to 15 men and three to five pickups, a medium-sized materials truck, a large truck or trailer for the tensioner, and another large truck.

"When the aluminum conductors have been installed and pulled

1/ SE&A Engineers and Planners, "Tracy-Hunt Transmission Project, U.P.&L. Intertie No. 2, Environmental Analysis," prepared for Sierra Pacific, April 1975.

to the proper sag and tension, a clipping crew permanently attaches the conductors to the insulators by removing the stringing sheaves and installing clamping hardware. This crew will use two pickup trucks in the course of their duty."

g. Substation Construction

An area 400 feet by 400 feet (3.67 acres) will be required for the substation location. This site will be cleared of all vegetation and covered with a 6-inch layer of crushed gravel. The boundary will be fenced to a height of 8 feet using chain link fence material. A considerable amount of construction activity will occur on the site to prepare concrete foundations and to install the various pieces of electrical equipment described previously.

h. Cleanup and Restoration

"Cleanup and site restoration will be started when the construction crews have completed a section of the line. Debris will be hauled away and the restoration crew will install water bars along any permanent roads that have been constructed." 1/ Where soil and climate are favorable, disturbed areas will be reseeded to re-establish a vegetative cover. All disturbed areas no longer needed for operation and maintenance will be smoothed to restore the natural ground contour.

i. Energize Line

Upon completing inspection of the constructed line and electrical facilities, the power system is energized by attaching leads at the power substations and closing switches.

1/ SE&A Engineers and Planners, "Tracy-Hunt Transmission Project, U.P.&L. Intertie No. 2, Environmental Analysis," prepared for Sierra Pacific, April 1975.

j. Maintenance

From time to time, small work crews with pickup trucks or a boom-equipped truck will perform necessary repairs to maintain the line. For this reason, access to and along the transmission line will be required following completion of the initial line construction.

B. ALTERNATIVES TO THE PROPOSED ACTION

1. Alternative Routes

a. Alternative Route 1 - Construct the 230 kilovolt transmission line adjacent to the present Tracy to Oreana 120 kilovolt power line. (See Map I-1).

(1) Power Line Route - Originating at the Tracy generating station, the line crosses both the Truckee River and Interstate Highway 80 traveling in a northerly direction for 2 miles. The line then runs in an easterly direction for 24 miles, generally paralleling Interstate Highway 80, passing 1-1/2 miles north of Wadsworth, Nevada, through the Pyramid Lake Indian Reservation near its southern extension and continuing east to the southern extension of the Truckee Range. At this point, the line crosses the City of Los Angeles Department of Water and Power 750 kilovolt power line and turns in a northeasterly direction for 43 miles, generally paralleling Interstate Highway 80, (lying within 1/2 to 3 miles of the highway for the most part), passing west of the Toulon 120 to 69 kilovolt substation and Lovelock, Nevada, to a point adjacent to the Humboldt River, west of Oreana, Nevada. At this point, the line turns east for 6 miles ending at the Oreana 120 kilovolt substation. See Photos Nos. I-1 and I-2 following page I-16.

(2) Power System Design - Would not differ from Sierra Pacific's proposed action.

(3) Stages of Implementation - The stages will be very similar to those for the proposed action. The major exception would be the lack of access construction needed along the line and a smaller requirement for tower site access spurs and equipment

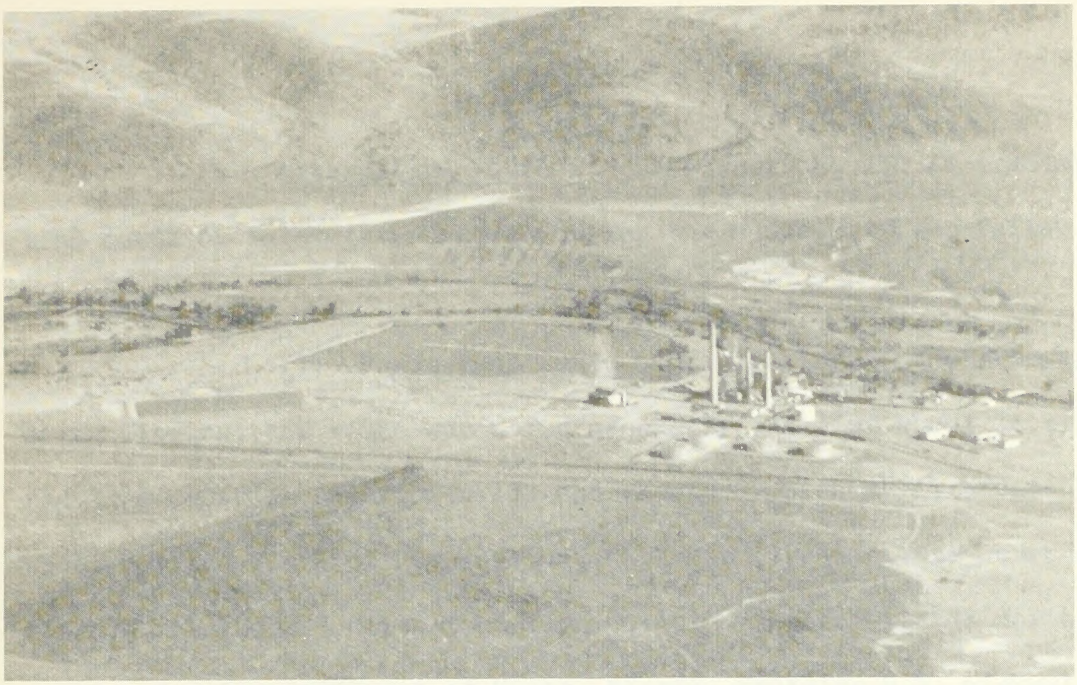

Photo I-1 Tracy Generation Station
View is north and shows the beginning points of the proposed and alternative routes. The proposed 230/345 kilovolt substation would lie north of Tracy (right background) on the flat in front of the small hill.

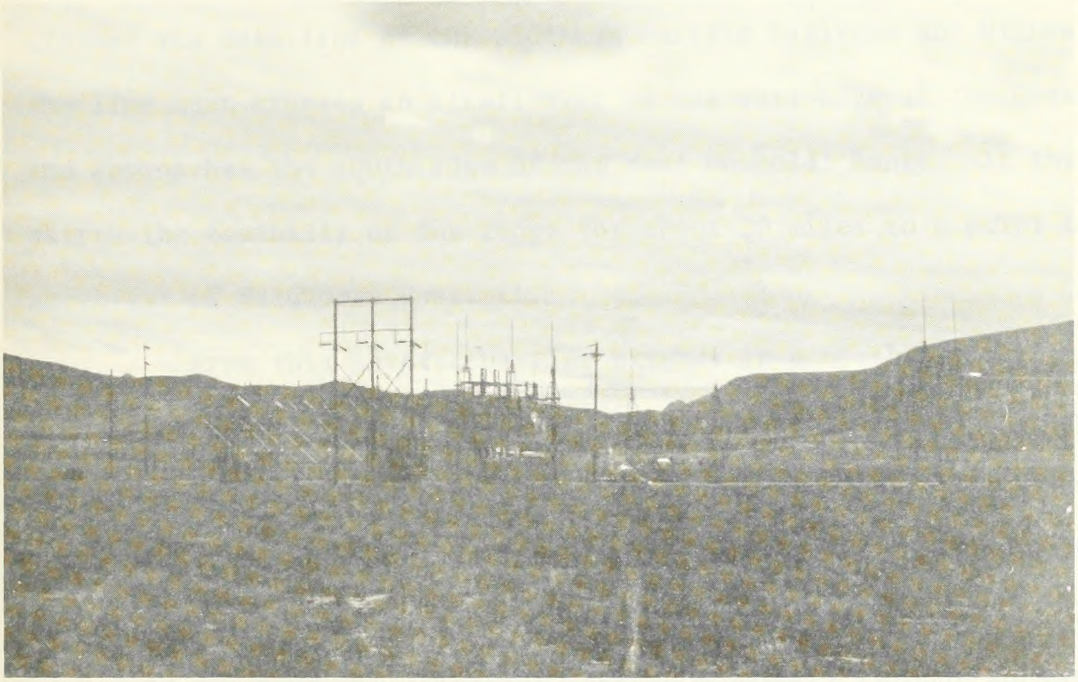

Photo I-2 Oreana 120 kilovolt substation located northeast of Lovelock, Nevada. This is the distribution point to the Lovelock District and the terminal point for all routes. View is east.

pads.

b. Alternative Route 2 - Construct the 230 KV transmission line south of Interstate Highway 80 and the Humboldt River Valley. (See Map I-1.)

(1) Power Line Route - Originating at the Tracy generating station, the route would run generally east for about 16 miles, the line crossing some low hills and then U.S. Highway Alternate 95 about 3 miles south of Fernley, Nevada. The line continues over flat terrain for about 7 miles to a turn point. It then extends northeast, passing 2 miles northwest of Hazen, Nevada, crossing U.S. Highway 95 and the main line of the Southern Pacific Railroad. The line then parallels the southeast side slope of the Hot Springs Mountains. Continuing northeasterly, it enters the west edge of the Carson Sink and crosses the main line of the Southern Pacific Railroad and Highway 95. The line next crosses an alkali flat on the west edge of the Carson Sink and approaches the south edge of the West Humboldt Range. It then skirts the foothills of the range for about 20 miles to a point 6 miles northeast of Wildhorse Pass.

From this point, the line extends in a northerly direction. Within the Humboldt Range foothills, the line crosses Coal Canyon Road, and continues 4 miles to the west edge of Packard Flat. The line would terminate at a switching station at this location. (The Oreana-Hunt 230 KV Intertie #2 continuation would begin at this point.) A 120 KV tap would run from the switching station northwest through Rochester Canyon to the Oreana substation.

(2) Power System Design - Would not differ from original Sierra Pacific proposal.

(3) Stages of Implementation - The stages will be very similar to those for the proposed action. The exception would be the lack of access construction needed along the line and a smaller requirement for tower site access spurs and equipment pads.

2. Other Alternatives

a. No Action Alternative: Deny transmission right-of-way. This alternative would curtail future growth in the service area or lead to other power alternatives such as (1) privately owned small generators (about 5 kilowatts) located at the demand site, or (2) generators operated by the power company (about 36,500 kilowatts) and located in the vicinity of the growing demand centers. Environmental analysis of these alternatives is difficult because locations are not known.

b. Underground Transmission Right-of-Way Alternative

This alternative would require using one of the three routes previously described. Because of the inherent construction requirements associated with this alternative, land surface disturbance is greater than any alternative considered. The trenching and cable installation will require a bladed area 32 feet wide for the right-of-way length to accommodate the trench, spoil pile, and equipment road. Also, insulating fluid used in this technique requires pumping stations along the line and these stations will require small transmission service lines for power.

The buried cable method is very expensive, costing about 10 times [1] the amount required to construct an equal distance of overhead power line.

In view of these disadvantages, the underground cable alternative will not be considered in this environmental analysis.

c. Upgrading the Existing 120 kilovolt Power Line

Sierra Pacific conducted a feasibility study concerning this subject prior to filing the subject application. Their conclusions were that the existing cedar poles lacked both the height and the strength for reliable conversion to 230 KV capacity.

Because of these disadvantages, this alternative is not considered to be technically feasible and will not be considered further.

d. Higher Capacity Lines and "Common Carrier" Use

As previously described, the proposed line has been designed for conversion to a higher capacity if the need arises.

The common carrier concept actually does not apply to this project as the applicant is the only utility serving the Reno area and there is little pass-through transmission potential. These alternatives will not be carried through the analysis.

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[1] Private correspondence from Willard Emmet, Bonneville Power Administration, July 1975.

DESCRIPTION OF THE EXISTING ENVIRONMENT

SECTION II

II. DESCRIPTION OF EXISTING ENVIRONMENT

A. Non-Living Components

1. Climate

The study area (the region covered by the three possible routes) has a semi-arid to arid climate. Factors affecting the area's climate include latitude, altitude, prevailing winds, seasons of the year, and local and regional topographical features. The climate is characterized by a wide fluctuation in day and night temperatures and scant variable precipitation.

The study area tends to be quite windy at times. The occasional strong and persistent winds cause a rapid, but temporary, increase in the amount of particulate matter in the air. This is especially pronounced on playa areas (dry lake beds) where localized dust storms can be quite severe.

The average annual rainfall in the study area is deficient because the rainfall and snowfall together are less than the evaporation rate. General rainfall information estimates 4 or fewer inches in the lowlands, 4 to 8 inches in the middle elevations, and 8 to 15 inches at the higher elevations within the study area. The area has mountain ranges with sufficient height to permit the formation of snow, although the amount is characteristically small and the cover is shallow.

Summer rain showers often occur as mid-afternoon thunderstorms and are frequently torrential in nature. The sparse vegetative cover allows the torrential rainfall to rapidly dissipate. These

short-term, high-intensity rainfalls, followed by a heavy runoff, are fairly common to the study area. The subsequent flooding creates water erosion that moves significant amounts of rock and debris downslope. This movement of material makes basin filling a dominant process in much of the province.

2. Air Quality

The relatively remote nature of the area has not made it necessary to monitor air quality as is common now in more urbanized areas. Therefore, no baseline air quality data are available for the study area except for the Reno-Sparks metropolitan area. During periods of air-temperature inversions, the Reno-Sparks area can be blanketed with a visible layer of air pollution, mostly automobile caused. Little of this pollution, however, extends into the study area itself.

Several other sources of pollutants along the power line corridor are monitored by the Air Quality Office of the Nevada State Environmental Protection Division. These include the Tracy power plant, the Fernley cement plant, and the Clark and Colado branches of Eagle-Picher, a company that processes diatomaceous earth (a very fine, powdery type of dirt). Table II-1 shows the emissions for particulates and sulfur dioxide (SO_2) for each of the sources as last sampled by the Air Quality Office.

In addition to man-caused sources of pollution, there are also natural sources. Dust storms are significant contributors to particulate pollution in many parts of the state, including the study area. During

Table II-1

Particulate and sulfur dioxide (SO_2) emissions from various sources along the power line corridor in kilograms per hour (kg/hr)

Source	Particulates		SO_2	
	Emission Rate (kg/hr)	Allowable Emissions (kg/hr)	Emission Rate (kg/hr)	Allowable Emissions (kg/hr)
Tracy Power Plant	142	86	566	162
Fernley Cement Plant				
Kiln #1	10	20	*	*
Kiln #2	6	20	*	*
Kiln #1**	9	20	11	24
Kiln #2**	12	20	11	
Eagle-Picher				
Clarks Station	1	5		
Colado Station				
#1	2	8		
#2+	13	9		
#3	1	6		

* SO_2 not sampled because fuel used was natural gas.

** Plant is converting to coal. These are estimated emissions.

+ Probable sampling error during this test.

periods of intense dust storms, the national and state air quality standards, with respect to particulates, are frequently exceeded.

The study area has several small voltage power lines of 120 kilovolts or less. There is one large voltage line, the Los Angeles Department of Water and Power's 750 kilovolt direct current transmission line, crossing the area in a north-south direction east of Pyramid Lake and Fernley. No data concerning corona effluent (production of ozone and nitrogen oxides) was found within the study area; however, the levels associated with the small alternating current power lines and direct current power lines are considered insignificant. Corona discharge (simply defined as electron escape from the conductor into the air) will occur at the highest rates during periods of high moisture collection on the lines or insulators. Such periods are associated with storm activity or fog, and are very infrequent in the area.

3. Land

a. Topography and Physical Setting

The area lies within the Basin and Range Province, a region characterized by isolated, elongated, and parallel mountain ranges and broad intervening valleys. Since all drainage leads to closed interior basins, rather than to the sea, the area lies within the Great Basin subdivision of the province.

The mountain ranges lie generally in a north-south direction and rise abruptly from the alluvial fans (a fan-shaped deposit of sand and mud formed by flowing water) that border them. The crests of

the ranges are jagged, but are usually continuous.

The valley bottoms are composed of alluvial material from surrounding mountain ranges. The alluvium often extends to great depths. Playas, which are remnants of ancient Lake Lahontan that once covered vast areas of northwestern Nevada, occupy the low portions of some enclosed desert basins.

Elevation of the area between Tracy and Oreana varies from 4,000 to 5,000 feet above sea level on the desert floors to about 7,000 feet on the crests of the higher mountain ranges.

The mountain ranges located west to east within the area between Tracy and Oreana include the Virginia Range, Truckee Range, Hot Springs Mountains, Trinity Range, and the West Humboldt Range.

The only river systems in the area are the Truckee River, which drains into Pyramid Lake, and the Humboldt River, which ultimately discharges into the Humboldt Sink (and occasionally through the lower Humboldt Drain into the Carson Sink).

b. Geologic Structure

The geology of the study area is typical of the Basin and Range Province. The complex geologic structures of Nevada are the result of several periods of deformation.

Mountain ranges, with some variations, are generally composed of volcanics with intermixed sedimentary deposits. Valley alluvium, unconsolidated gravel, and wind-blown sand deposits are present in the valleys and flood plains throughout the area. The

alluvial fan gravel is composed of boulders of various rock types mixed with gravel and finer material deposited at the canyon mouths. The valley alluvium consists of coarse to fine sand and silt, often several thousand feet thick. See Generalized Geology Map II-1.

c. Seismology

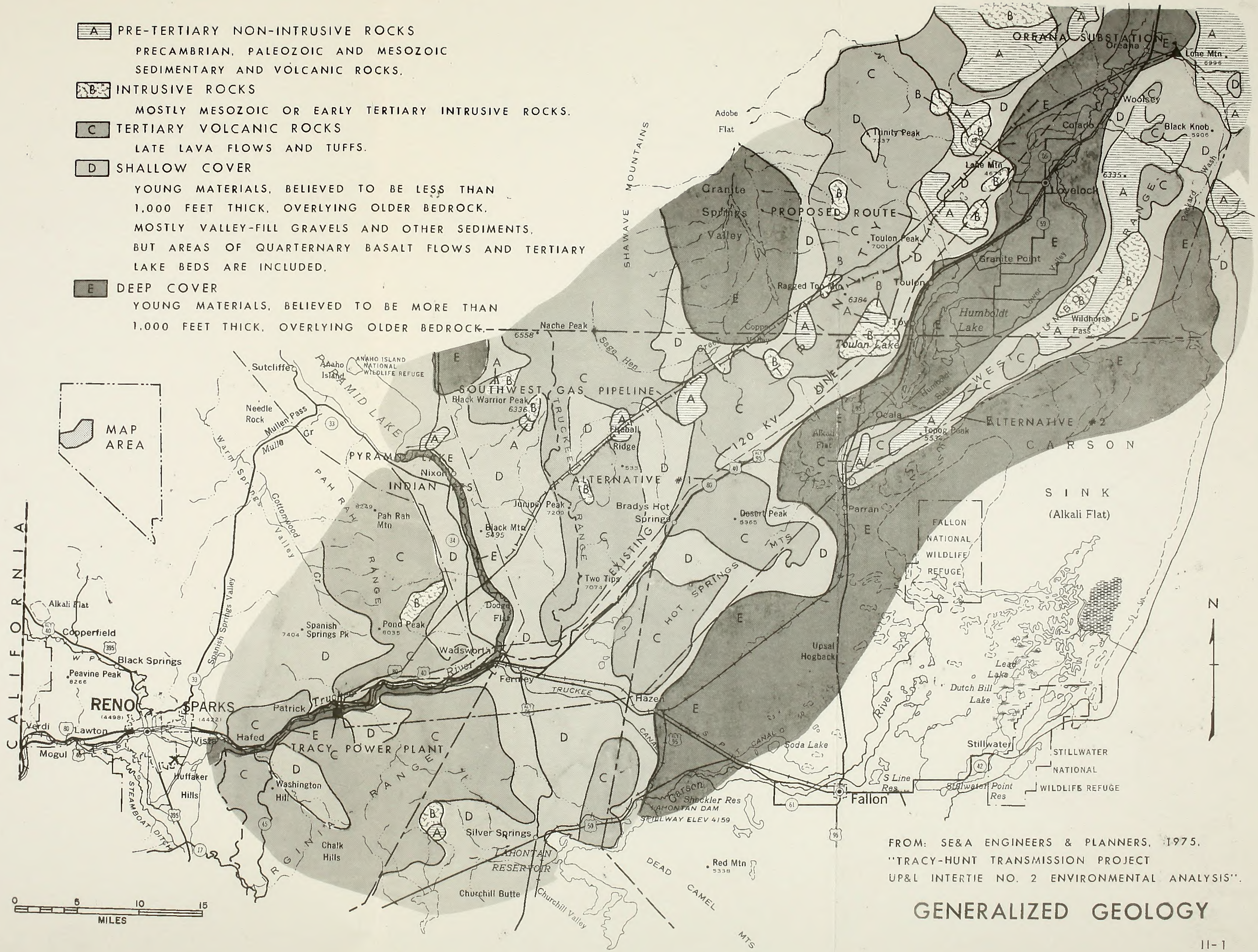
The region is seismically active or susceptible to earthquakes. The 118 degree meridian zone is one of the more active seismic zones in the nation. The earthquakes are generally associated with movements along normal and strike-slip faults. The intense level of seismic activity in western Nevada may be related to long-term crustal instability. Mineralization and hot springs are related to faulting within this seismic zone.

Earthquakes with magnitudes greater than 6.0 on the Richter scale occurred southwest of Gabbs in 1932, at Frenchman Station, Dixie Valley, and the area east of Fallon in 1954, and in Dixie Valley in 1959. The maximum vertical displacement resulting from the 1954 Dixie Valley earthquake was 20 feet. Surface faulting has occurred within historic times on Fairview Peak, on the east slope of the Stillwater Range, and along the Clan Alpine Range.

Based on the seismic history of the area, it is probable that more earthquakes of at least 6.0 will occur within the 118 degree meridian zone. Earthquakes greater than 7.0 are also possible.

d. Geothermal Resources

Brady's Hot Springs is about 18 miles northeast of Fernley on the northwest flank of the Hot Springs Mountains. A large portion of the area has been classified by the U. S. Geological Survey as the Brady's Hot Spring Known Geothermal



FROM: SE&A ENGINEERS & PLANNERS, 1975,
"TRACY-HUNT TRANSMISSION PROJECT
UP&L INTERTIE NO. 2 ENVIRONMENTAL ANALYSIS".

GENERALIZED GEOLOGY

Resource Area. These hot springs are along a fault zone crossing at the foot of the Hot Springs Mountains. To date, 13 exploratory wells have been drilled in an attempt to make use of the geothermal resource.

e. Mineralization

Significant mineralization in the area between Tracy and Oreana will be discussed briefly in this section.

Diatomite is mined by Eagle-Picher Industries from an open pit and processed at a nearby plant at Clark Station. More than 100 tons of diatomite (diatomaceous earth) are processed each day. The Eagle-Picher Company is also mining diatomite from Section 25, T. 28 N., R. 28 E. in the Trinity Range.

The Olinghouse mining area is located near Wadsworth on the eastern slope of the Pah Rah Range, extending from Big Mouth Canyon south to the Truckee River Canyon. Gold and silver ores have been mined in the area.

Limestone is being quarried south of Fernley by Nevada Cement for use in making cement. The deposit will continue to be used for years.

The mineral area which includes the West Humboldt Range contains large amounts of proven mineral reserves. The area contains gold, silver, copper, mercury, iron, lead, tungsten, antimony, gypsum, and perlite. The active Rochester mining area has produced large quantities of gold, silver, copper, and lead (more than $8 million total production to date.)

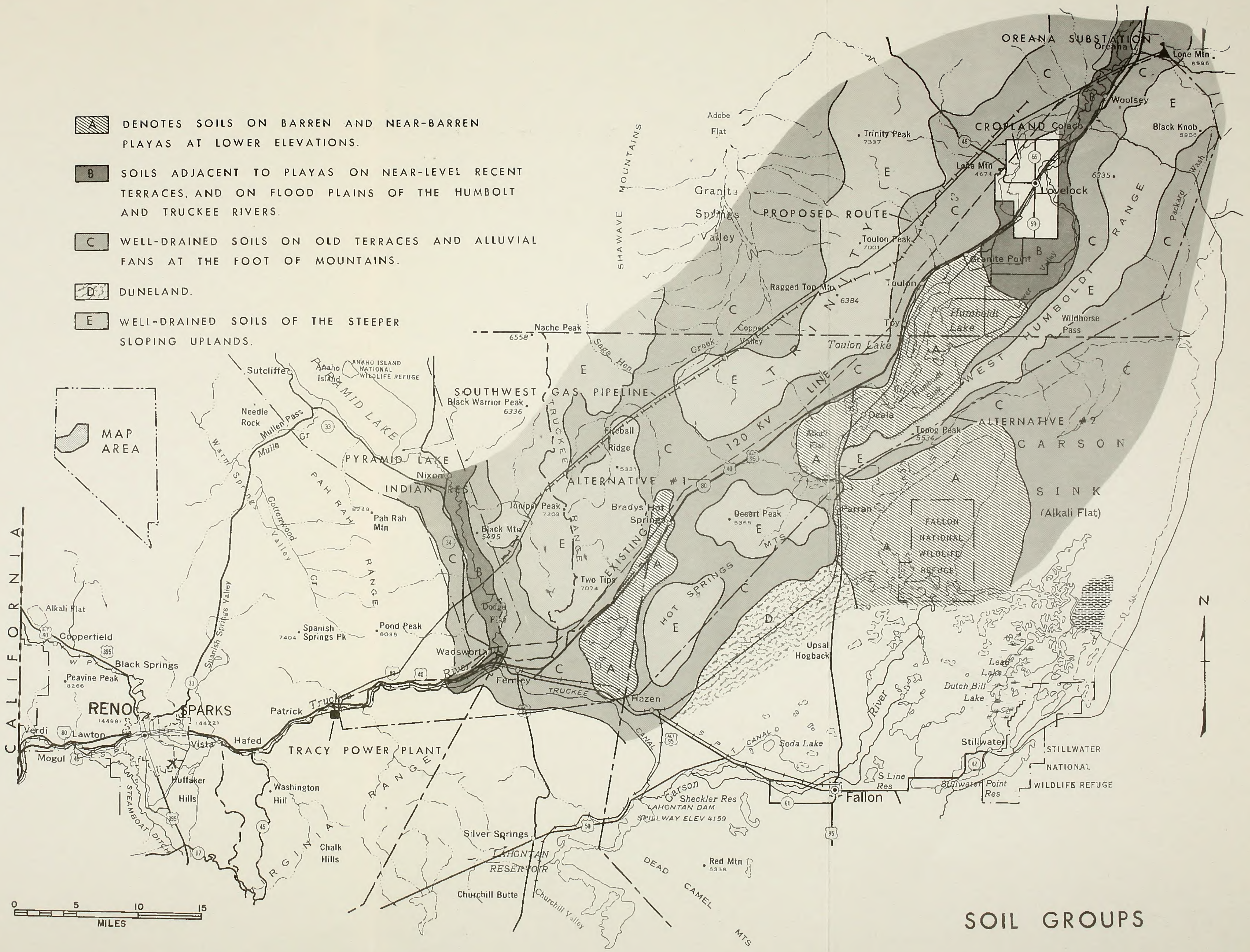
f. Soils

The study area from Tracy along the Truckee River

to Oreana on the western slope of the Humboldt Range is a 90-mile strip of arid soil types that exhibit a wide variety of depths, texture, and structure. Most of them are scientifically classified as Aridisols and Entisols in the new Soil Conservation Service soil classification system. These are synonomous with Sierozem and Regosols in the old 1938 soil classification system. Aridosol soils are found in cool, arid regions. They are well developed, light colored, shallow to deep, well drained, carbonate enriched, and often have carbonate hard pans. Entisols are found in cool, arid regions on hilly land. They are weakly developed, well to excessively drained, shallow to moderately deep, light colored, and often calcareous.

In this report soils are placed into five different groups, based primarily on topographical location or land form. See Soil Group Map II-2, and Appendix 1 for specific soil descriptions. A short summary of each group follows:

(1) Group A - This group consists of soils and playa (unconsolidated material devoid of vegetation) on the barren and near-barren valley bottoms at the lowest elevations. The soil group is 80 percent playa but also contains some soils that are deep to moderately deep over duripans (a hard, silica cemented layer). The group is usually saline-alkaline (pH 8.5 to 9.5), and supports diverse plant communities of big greasewood, seepweed, pickleweed, saltgrass, and other saline-alkali tolerant species. Soil structure ranges from strong clay subsoil development to massive coarse-textured sandy profiles, and most soil surfaces are platy (thin-layered) and hard when dry. The strong alkalinity has an adverse effect on the availability of such nutrients as phosphorus and iron (see Soil Appendix No. 1), and is corrosive to concrete and steel.


A DENOTES SOILS ON BARREN AND NEAR-BARREN PLAYAS AT LOWER ELEVATIONS.
B SOILS ADJACENT TO PLAYAS ON NEAR-LEVEL RECENT TERRACES, AND ON FLOOD PLAINS OF THE HUMBOLT AND TRUCKEE RIVERS.
C WELL-DRAINED SOILS ON OLD TERRACES AND ALLUVIAL FANS AT THE FOOT OF MOUNTAINS.
D DUNELAND.
E WELL-DRAINED SOILS OF THE STEEPER SLOPING UPLANDS.
MAP AREA
CALIFORNIA
OREANA SUBSTATION
Oreana
Lone Mtn 6996
Woolsey
Black Knob 5906
CROPLAND
Colado
Trinity Peak 7337
Lone Mtn 4674
Lovelock
6335
Adobe Flat
Granite Springs Valley
SHAWAVE MOUNTAINS
PROPOSED ROUTE
Toulon Peak 7001
Granite Point
Lower Valley
Ragged Top Mtn 6384
Toulon
Toy
Humboldt Lake
HUMBOLDT RANGE
Packard Wash
Wildhorse Pass
Nache Peak 6558
Sage Hen Creek
Copper Valley
Toulon Lake
TRINITY
WEST HUMBOLDT
SOUTHWEST GAS PIPELINE
Black Warrior Peak 6336
TRUCKEE RANGE
120 KV LINE
Humboldt Sink
Ocala
Alkali Flat
Topog Peak 5534
ALTERNATIVE #2
CARSON SINK (Alkali Flat)
Fireball Ridge
ALTERNATIVE #1
Jupiter Peak 7209
Bradys Hot Springs
Desert Peak 5365
Parran
FALLON NATIONAL WILDLIFE REFUGE
Black Mtn 5495
EXISTING
HOT SPRINGS MTS
Two Tips 7074
Dodge Flat
Upsal Hogback
Sutcliffe
ANAHO ISLAND NATIONAL WILDLIFE REFUGE
Anaho Island
PYRAMID LAKE
Needle Rock
Mullen Pass
Mullen Cr
Warm Springs
PYRAMID LAKE INDIAN RES.
Nixon
PAH RAH RANGE
Pah Rah Mtn 8249
Cottonwood Valley
Spanish Springs Valley
Spanish Springs Pk 7404
Pond Peak 8035
Alkali Flat
Copperfield
Black Springs
Peavine Peak 8266
RENO (4498)
SPARKS (4422)
Verdi
Lawton
Mogul
Vista
Hafed
Patrick
Truckee River
Wadsworth
Fernley
TRUCKEE CANAL
Hazen
TRACY POWER PLANT
Huffaker Hills
STEAMBOAT DITCH
Washington Hill
VIRGINIA RANGE
Chalk Hills
Silver Springs
LAHONTAN RESERVOIR
Churchill Butte
Churchill Valley
Carson River
Sheckler Res
LAHONTAN DAM SPILLWAY ELEV 4159
DEAD CAMEL MTS
Red Mtn 5338
Soda Lake
S Line Res
Fallon
Lead Lake
Dutch Bill Lake
Stillwater
Stillwater Point Res
STILLWATER NATIONAL WILDLIFE REFUGE
N
0 5 10 15 MILES

SOIL GROUPS

(2) Group B - This group consists of the soils adjacent to and surrounding the playas on near-level, recent terraces and on flood plains of the Humboldt and Truckee Rivers.

The soils are all deep, or moderately deep, over duripans or gravel substratum. Most have platy surfaces, and only a few contain enough organic matter to significantly affect water-holding capacity and soil erosion. Vegetative cover includes big greasewood, fourwing saltbrush, saltgrass, pickleweed, and willows.

There are no significant soil pollutants, and soil erosion consists primarily of wind ersion that occurs mostly on the sparsely vegetated soils. Man-made vegetative disturbances are a significant contributing factor to wind erosion. (See Appendix No. 1).

(3) Group C - These soils are well-drained and have developed on old terraces and alluvial fans at the foot of the mountains. They range from deep to shallow, over hardpans, and are platy at the surface with some hardpans ranging from 12 to 20 inches below the surface.

There are no pollutants of any consequence in these soils; wind erosion is ever present from the prevailing westerly winds. Water erosion can be severe during summer thunderstorms, but storms of high magnitude are infrequent in this dry environment. Man-caused surface soil disturbances can only be corrected by a slow, natural rehabilitation process that is hindered by the extremely dry climate. (See Appendix No. 1).

Common natural vegetation cover includes shadscale, dryland greasewood, bud sagebrush, spiny hopsage, horsebrushes, and small amounts of Indian rice grass.

(4) Group D - This soil group is found in duneland areas where soil material is continually moving with wind action. These soils occur on the southern flank of alternative route 2. The sandy soils are deep, coarse textured, without much structure and are low in basic nutrients, water-holding capacity, and soil pollutants. Erosion is extremely high during strong wind action and, as a result, more than half of the area is unstabilized by the native vegetation. Common vegetation occurring in this group consists of big greasewood, horsebrush, and Indian ricegrass. Although these soils have a low water-holding capacity, they also have a high infiltration and absorption rate. As a result, vegetation yields are higher than on surrounding silt and clay surface soils, because most of the meager precipitation that falls enters the soil for vegetation use. (See Appendix No. 1).

(5) Group E - This soil group consists of those well-drained soils occurring on the steeper sloping uplands. These range in depth from moderately deep to very shallow over bedrock. They contain more organic matter than soils in Group C because they receive more annual precipitation. They are also the oldest soils in the area.

Soil pollutants are practically nonexistent. Soil water erosion is extensive and ranges from slight to critical because of a combination of steep slopes, low density vegetal ground cover, and disturbance of human activities. All soils in this group are highly susceptible to erosion and should be rehabilitated following any disturbance. This includes water-barring all surface soil disturbances

on any grade of more than 0.5 feet per hundred feet. (This is a process of rehabilitating bull-dozed slopes by creating sail ridges to act as water barriers to reduce water velocity.)

Most of the vegetation cover consists of big and low sagebrush plant communities. Shadscale communities occur on some of the lower slopes. About one-fifth of the proposed route crosses this group. (See Appendix No. 1).

g. Land Uses 1/

(1) Agriculture

As a general land use, agricultural activities are dominant within the five-county study area, with livestock production accounting for more than 65 per cent of total agricultural production. All national resource lands with surface resources under the administration of the BLM are covered by grazing allotments. Forage conditions range from very poor to fair.

(2) Recreation

Recreational activities in the area are projected to increase due to the close proximity of the expanding Reno-Sparks urban complex and to increasing leisure time. It has been estimated outdoor recreation attendance not including hunting within the study area will increase by the following percentages by 1980:

1/ For greater detail, see the Economic Profile for BLM in Nevada, 1974, Regional Environmental Analysis Records, Geothermal Leasing in Fort Churchill-Clan Alpine Area and Pyramid Area, Carson City, District, Nevada; and Blue Wing Sonoma Planning Unit URA, Winnemucca District, Nevada.

Table II-2
PROJECTED INCREASE IN RECREATIONAL
ACTIVITY BY COUNTY

County	1970 User Days	1980 User Days	Percentage of Increase
Churchill	288,712	513,665	56 per cent
Storey	3,824	3,824	0 per cent
Washoe	9,742,464	19,628,568	50 per cent
Lyon	211,843	405,419	52 per cent
Pershing	151,110	291,518	52 per cent

(3) Minerals

The mining industry is of significant importance to two counties within our five-county study area - Lyon and Pershing. In Pershing County, nearly 15 per cent of the total personal income is derived from the mining industry, while the extraction and smelting of copper in Lyon County accounts for more than 27 per cent of all personal income in that county. The Lyon County operation accounts for more than 17 per cent of all income from mining in Nevada for 1969. Current geothermal land use in the study area has been limited to preliminary geophysical exploration conducted under BLM permit.

(4) Transportation

(a) Roads

Major transportation routes within the study area include Interstate Highway 80; State Highways 34, 48, Alternate 95; and U. S. Highway 95. Interior roads of varying quality provide access to the proposed route and alternatives. (Map I-1 shows the transportation net.)

(b) Utilities

Sierra Pacific's Tracy generating plant located

in the Truckee Canyon provides electrical service via numerous distribution lines extending east and west from the plant to Reno and the Lovelock-Winnemucca area. Lines also distribute power southwest to the agricultural areas of Fernley and Fallon. The City of Los Angeles owns a 750 kilovolt direct current line that passes through the study area in a north to south direction. This line passes east of Fernley to Lahontan Dam and then south.

Southwest Gas Corp. has a natural gas pipeline that crosses the Copper Valley located in Churchill and Pershing Counties extending in a northeasterly to southwesterly direction. The proposed route would parallel this portion of the pipeline for about 50 miles beginning at the east side of the Pyramid Indian Reservation and continuing to west of Oreana.

(c) Rail

The Southern Pacific Railroad will affect both the proposed route and alternative 2 will cross the rail line three times before terminating at the Oreana substation.

(d) Rivers

The proposed route crosses the Truckee River once near the Tracy plant and again on the Pyramid Lake Reservation. It crosses the Humboldt River near the Oreana substation.

(5) Wildlife

Uses of the lands by wildlife are diverse, however, there are areas offering specific habitat advantages. The irrigated agricultural areas of Lyon, Churchill, and Pershing Counties offer prime pheasant hunting and account for the majority of hunter days spent in the state.

Photo II-1
Photo depicts the land use adjacent to the proposed and alternative route 1, northwest of Lovelock, Nevada. The route lies along the lower edge of the photo, 1000 feet from the Southwest Gas Corp. pipeline. Also in the foreground is the access trail for the existing Sierra Pacific 120 kilovolt line, alternative route 1.

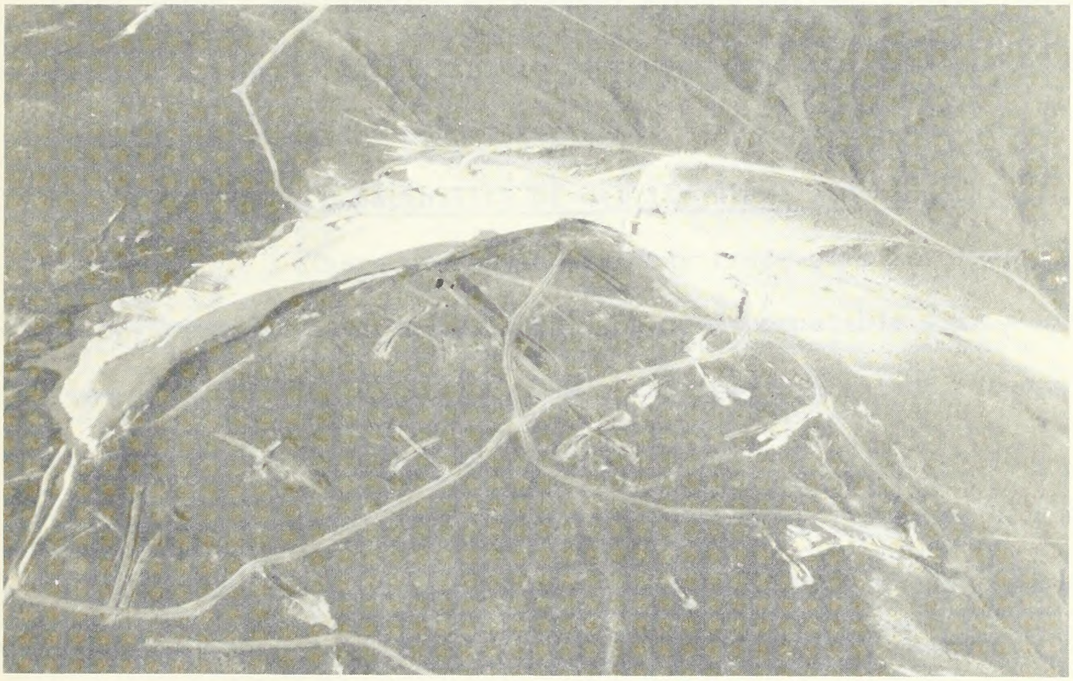


Photo II-2
Photo depicts a common land use in the study region. There are several mining districts along the proposed route and alternative route 2. This is a gypsum mine adjacent to the route near the north end of Fireball Ridge.

The Nevada Department of Fish and Game and the U. S. Fish and Wildlife Service operate the 224,000 acre Stillwater Wildlife Management area which includes the Fallon and Stillwater refuges in the Carson Sink. Management is governed by a cooperative agreement among these two agencies and the Truckee-Carson Irrigation District and is oriented toward providing nesting, resting, and feeding areas for migratory waterfowl.

The Nevada Department of Fish and Game manages the Fernley State Wildlife area east of Fernley. The site provides resting, feeding, and nesting areas for migratory waterfowl and other birds.

(6) Other Land Uses

The Bureau of Reclamation, in cooperation with the Truckee-Carson Irrigation District, manages national resource lands under a reclamation withdrawal around Fallon. These lands are managed primarily for irrigation purposes, and the area's agricultural industry is dependent upon these lands.

h. Compatibility of Utility Lines and Land Uses

There are obviously many trade-offs involved in determining what land uses will be most compatible with a utility line in a specific situation. To a considerable extent, "compatibility" is subjective, depending on the point of view.

Open land, for example, may be an attractive site for utility construction from the viewpoint of the utility and general public, yet many farmers may feel some other land use might be more compatible. Although many government preserves, such as refuges, offer the advantage of minimum disturbances to daily human activities, especially those of a commercial nature, conservationists usually

in the Truckee Canyon provides electrical service via numerous distribution lines extending east and west from the plant to Reno and the Lovelock-Winnemucca area. Lines also distribute power southwest to the agricultural areas of Fernley and Fallon. The City of Los Angeles owns à 750 kilovolt direct current line that passes through the study area in a north to south direction. This line passes east of Fernley to Lahontan Dam and then south.

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regard the utility lines as intrusions incompatible with preservation of wilderness or other natural areas.

To many segments of the public, a utility line seems less obtrusive through industrial and commercial land, where large structures already exist, than through residential areas; however, those with interest in this land type consider it unsuitable for a power line corridor.

Additional problems in locating utility lines are population density or developmental intensity. In urbanized areas, for example, utility line location is generally considered to be difficult, corridors limited, land costly, and often undesirable due to use conflicts.

Rural areas, in comparison, present fewer problems to utility line placement. There are often fewer man-made constraints to limit the possible location of the utility corridor. Single ownership of large tracts of rural land generally makes right-of-way acquisition easier for the utility company.

Electromagnetic noise associated with transmission lines must be considered since weaker television and radio transmission in the rural areas are more easily disrupted. Such interference can be minimized in all but a very few remote areas by utilizing technological improvement of line design, conductor size, and individual corrections.

Generalizations about compatibility of utility lines with various land uses are risky at best and often times misleading. Few, if any, adjacent land uses are ideally compatible with utility lines.

On the other hand, the difficulty in reconciling some types of land uses with utility lines is seldom enough to warrant their total exclusion. (See Appendix No. 7.)

(i) Land Use Suitability

The lands within the study area are presently being utilized for a variety of purposes including livestock grazing, crop production (meadow hay), outdoor recreation, fish and wildlife, and transportation and utility systems. In general, the suitability of lands for the various uses overlap and are controlled by physical factors such as soil properties, topography, climate, and vegetation. The heaviest use of the lands occurs in the summer and fall months when livestock graze, and when recreationists, hunters, and fishermen pursue their various activities. Except for big game, upland game birds, and other wildlife, most of the area is used little during the winter.

The suitability of land for utilities is determined by such criteria as topography, soil-bearing strength, and demand. Generally rights-of-way are located for advantages of access, gentle terrain, ease of construction, and shortest line. If the demand is great enough, almost any land can be made suitable.

4. Water

The average annual precipitation of the study area is 6 inches. Of this amount, an average of six percent runs off, three percent recharges the underground aquifers, and 97 percent (including run off) eventually returns to the atmosphere through evapotranspiration.

Groundwater moves very slowly from mountainous recharge areas to the valleys. The rate of movement varies from inches to several hundred feet per year.

The surface waters of the study area are generally alkaline due to the chemical nature of the earth materials through which they flow.

The dissolved oxygen content of the study area water ranges from 8 parts per million to 9.5 parts per million more than adequate for wildlife needs. The summer average temperature of the Truckee River is 63 degrees Fahrenheit. Surface temperatures in Rye Patch Reservoir average 80 degrees Fahrenheit in the summer.

The sediment load of streams in this area runs higher during the spring time and infrequent summer thunderstorms. Some channels run higher than five per cent sediment for very short periods.

See Water Resource Data for Nevada by U.S.G.S. 1969 and 1974 for more information.

B. Living Components

1. Vegetation

The proposed and alternative routes pass through two basic vegetative types, the salt desert shrub and the northern desert shrub. The former is found on the lower mountain slopes and valleys, while the latter is generally restricted to the mountains. The major portion of the proposed and alternative routes cross the salt desert shrub vegetative type. Small areas of cropland and riparian vegetation will also be crossed. (See vegetation Map II-4.)

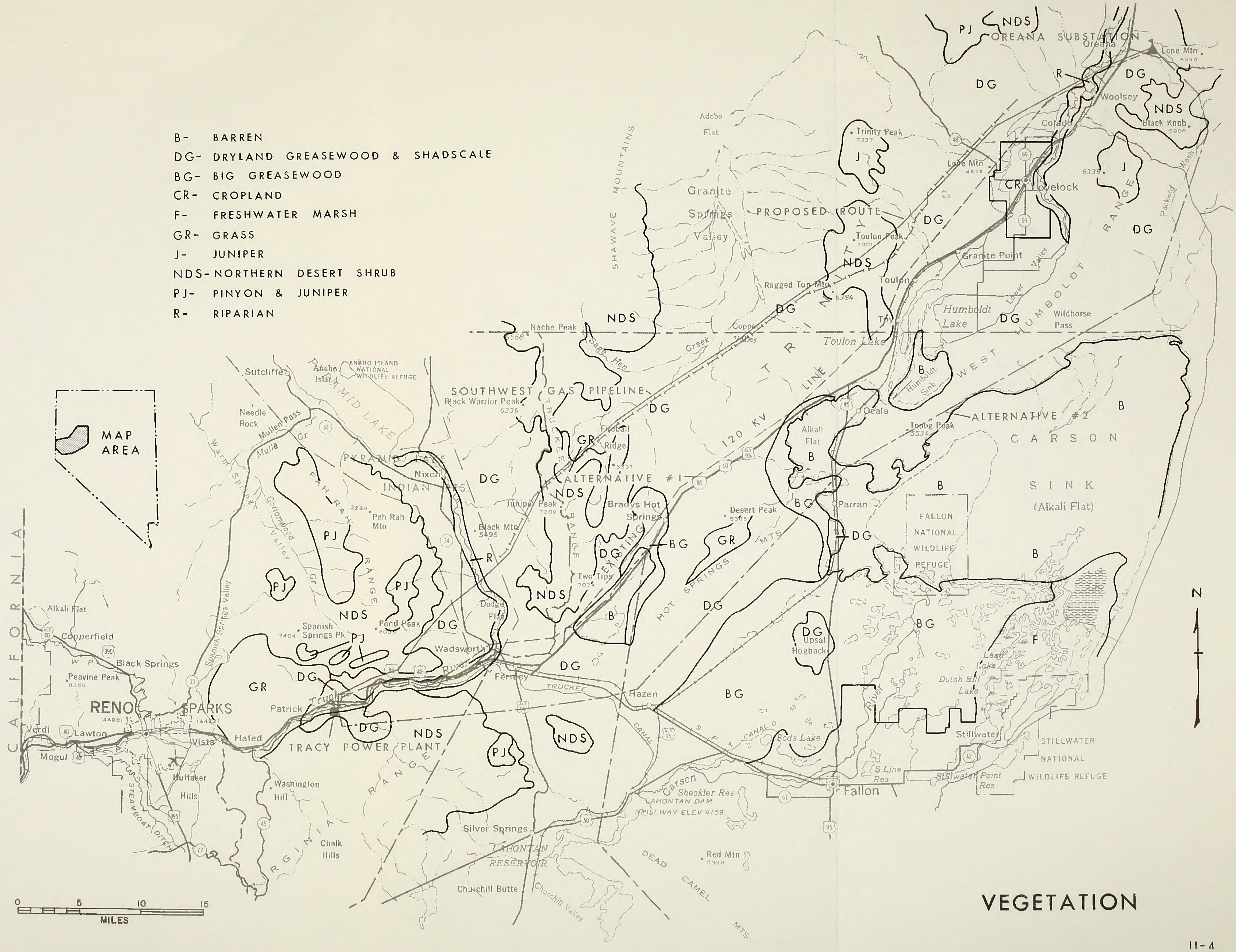
A list of endangered and threatened plants of Nevada was published in the Federal Register of July 1, 1975. Although several of these are reported in habitats similar to the study area, none have actually been reported along the study routes.

A discussion of the communities found in the major vegetative types follows.

a. Salt Desert Shrub

(1) Shadscale/Budsage Community

This community is generally found on alluvial fans within the study area. In some areas, a large undergrowth of cheatgrass becomes the co-dominant species, while in other areas, such as in the Copper Valley, budsage is the co-dominant species. Other shrubs and grasses occurring in smaller numbers make up the rest of the community. Some of these species are identified in Appendix 2-A. Although many of these species do occur in association with each other, not all of them are found evenly distributed throughout


B- BARREN
DG- DRYLAND GREASEWOOD & SHADSCALE
BG- BIG GREASEWOOD
CR- CROPLAND
F- FRESHWATER MARSH
GR- GRASS
J- JUNIPER
NDS- NORTHERN DESERT SHRUB
PJ- PINYON & JUNIPER
R- RIPARIAN
MAP AREA
CALIFORNIA
OREANA SUBSTATION
Oreana
Lone Mtn
Woolsey
Black Knob
Colado
Lake Mtn
Lovelock
Trinity Peak
Adobe Flat
Granite Springs Valley
PROPOSED ROUTE
SHAWAVE MOUNTAINS
Toulon Peak
Toulon
Ragged Top Mtn
Granite Point
Humboldt Lake
Lower Valley
HUMBOLDT RANGE
WEST HUMBOLDT
Wildhorse Pass
Packard Wash
TRINITY
Toulon Lake
Toy
Humboldt Sink
Nache Peak
Sage Hen
Copper Valley
Creek
120 KV LINE
SOUTHWEST GAS PIPELINE
Black Warrior Peak
Fireball Ridge
ALTERNATIVE #1
ALTERNATIVE #2
Ocala
Alkali Flat
Toptop Peak
CARSON SINK (Alkali Flat)
Parran
Desert Peak
HOT SPRINGS MTS
FALLON NATIONAL WILDLIFE REFUGE
Upsal Hogback
Sutcliffe
Anaho Island
ANAHO ISLAND NATIONAL WILDLIFE REFUGE
PYRAMID LAKE
PYRAMID LAKE INDIAN RES
Nixon
Needle Rock
Mullen Pass
Warm Springs Valley
Cottonwood Valley
PAH RAH RANGE
Pah Rah Mtn
Black Mtn
Juniper Peak
TRUCKEE RANGE
Bradys Hot Springs
EXISTING
Two Tips
Dodge Flat
Pond Peak
Spanish Springs Pk
Spanish Springs Valley
Wadsworth
Fernley
Hazen
TRUCKEE CANAL
S P
Soda Lake
Lead Lake
Dutch Bill Lake
Stillwater
STILLWATER NATIONAL WILDLIFE REFUGE
Stillwater Point Res
S Line Res
Fallon
Carson River
Sheckler Res
LAHONTAN DAM
SPILLWAY ELEV 4159
LAHONTAN RESERVOIR
Silver Springs
Churchill Butte
Churchill Valley
DEAD CAMEL MTS
Red Mtn
Alkali Flat
Copperfield
Black Springs
Peavine Peak
RENO
SPARKS
Verdi
Lawton
Mogul
Vista
Hafed
Patrick
Truckee River
TRACY POWER PLANT
Huffaker Hills
STEAMBOAT DITCH
Washington Hill
VIRGINIA RANGE
Chalk Hills
0 5 10 15
MILES
N

VEGETATION

the community.

Revegetation in this community is very difficult to impossible, largely due to the arid climate. (Bleak, et al, 1965).

(2) Dryland Greasewood/Shadscale Community

This community is found along the base of the mountain ranges and on the pre-historic lake beach terraces in the valleys. Dryland greasewood and shadscale are co-dominant species occurring fairly uniformly throughout the community. Scattered at intervals are several smaller associations. These include pockets of winterfat, dryland greasewood/Indian ricegrass, and dalea. A number of other shrubs and grasses are found in small numbers scattered within the community. Aside from the stands of Indian ricegrass, cheatgrass is the most common grass species. Appendix 2-B lists the common species of the dryland greasewood/shadscale community.

Again, revegetation in this community is very difficult to impossible.

(3) Big Greasewood Community

This community is generally located in areas of higher water table. In the study area, it is found on the flood plains along the Humboldt River near Oreana and on the fringes of playa areas.

Commonly found in association with big greasewood is saltgrass. In some areas, shadscale will also be found intermingled with big greasewood. Other species are also found, but in smaller numbers. (See Appendix 2-C.) Vegetation is generally sparse, with large areas of the alkali soils exposed.

Revegetation of this community is difficult. (Rollins, et al, 1968.)

b. Northern Desert Shrub

The northern desert shrub vegetative type includes both the big sagebrush and the low sagebrush communities. These may exist in some places in almost pure stands and in others as a mixture. They occupy the land above the salt desert shrub vegetative type, generally from 4,500 to 8,700 feet. Other common shrubs in these communities include bitterbrush, Mormon tea, and rabbitbrush. At the higher elevations, snowberry, currant, and mountain mahogany are found, along with forbs such as mule's ears and lupine.

In the better condition areas (usually higher elevations) grasses make up a large portion of the composition and include needlegrass, bluegrass, great basin wild rye, and bluebunch wheat grass. At the lower elevations, the condition is generally poorer and the grasses include mainly cheatgrass and squirrel tail. The proposed route mainly passes through these less productive (lower elevation) communities of the northern desert shrub vegetative type. Rehabilitation could be difficult in this vegetative type due to steep slopes and success is questionable due to climate; however, the chance of success is somewhat better than in the salt desert shrub vegetative type. Appendix 2-D lists the common species in the northern desert shrub type.

Photo II-3
View is of the proposed and alternative routes near Lone Mountain west of Lovelock. The photo depicts the salt desert shrub vegetative cover (shadscale, budsage, and annuals) common throughout the study area.

Photo II-4
View is southwest along the proposed route from Ragged Top Pass. The photo depicts the typical northern cold desert shrub (sagebrush, rabbitbrush) vegetation at the higher elevations in the study area.

2. Animal Life

The study area contains a diversity of animals including domestic livestock, wild horses, and wildlife (mammals, birds, amphibians, reptiles, and fish). The distribution and abundance of these species is influenced by the vegetative zones discussed in the previous section.

a. Threatened or Endangered Wildlife

There are six species of wildlife in the study area that are threatened with extinction or are extinct from the area. Seven species of birds inhabiting the area are considered as rare or endangered within the State of Nevada. These species are listed in the Appendix 3-A.

Various species of birds contained in the National Audubon Society's "Blue List" which are considered to be declining in population include species found in the study area. These species are noted in Appendix 3-B.

b. Terrestrial Animals

(1) Livestock

Many ranches within the study area are mainly dependent upon native forage of the national resource lands for feeding livestock during a major portion of the year while depending upon cultivated hay or grain to fill out the balance of the year. Some lands held by the Southern Pacific Railroad, Bureau of Reclamation, and Nevada Fish and Game Commission are also grazed.

(2) Wild Free-Roaming Horses

Within the area, wild horses are found on the Pah Rah, Virginia, Truckee, and Trinity Mountain Ranges. The 1974 wild horse inventory found 101 horses on the Pah Rah Range, 44 horses

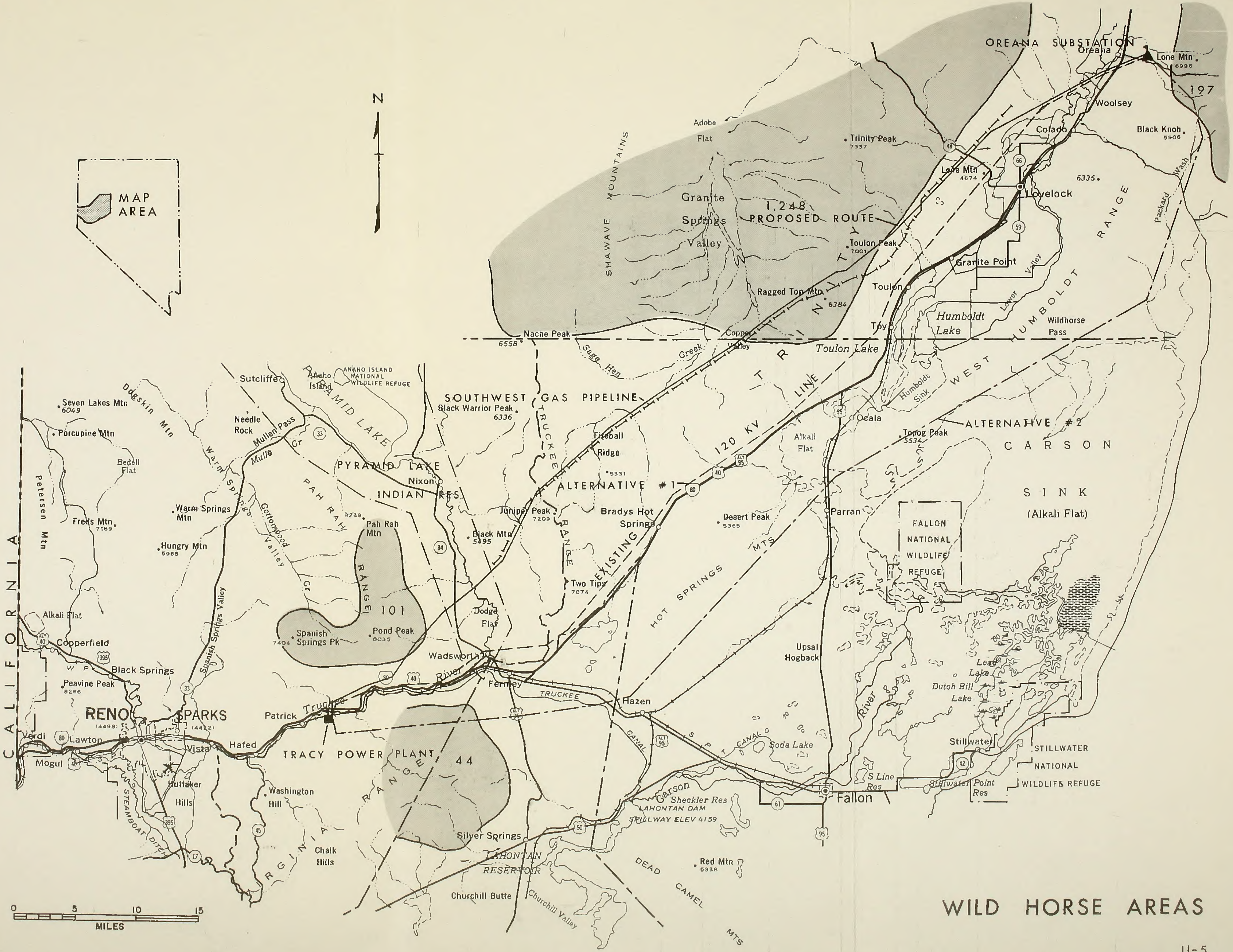
on the Virginia Range, and 1,248 horses on the Truckee-Trinity mountain ranges. (See Map II-5).

(3) Wildlife

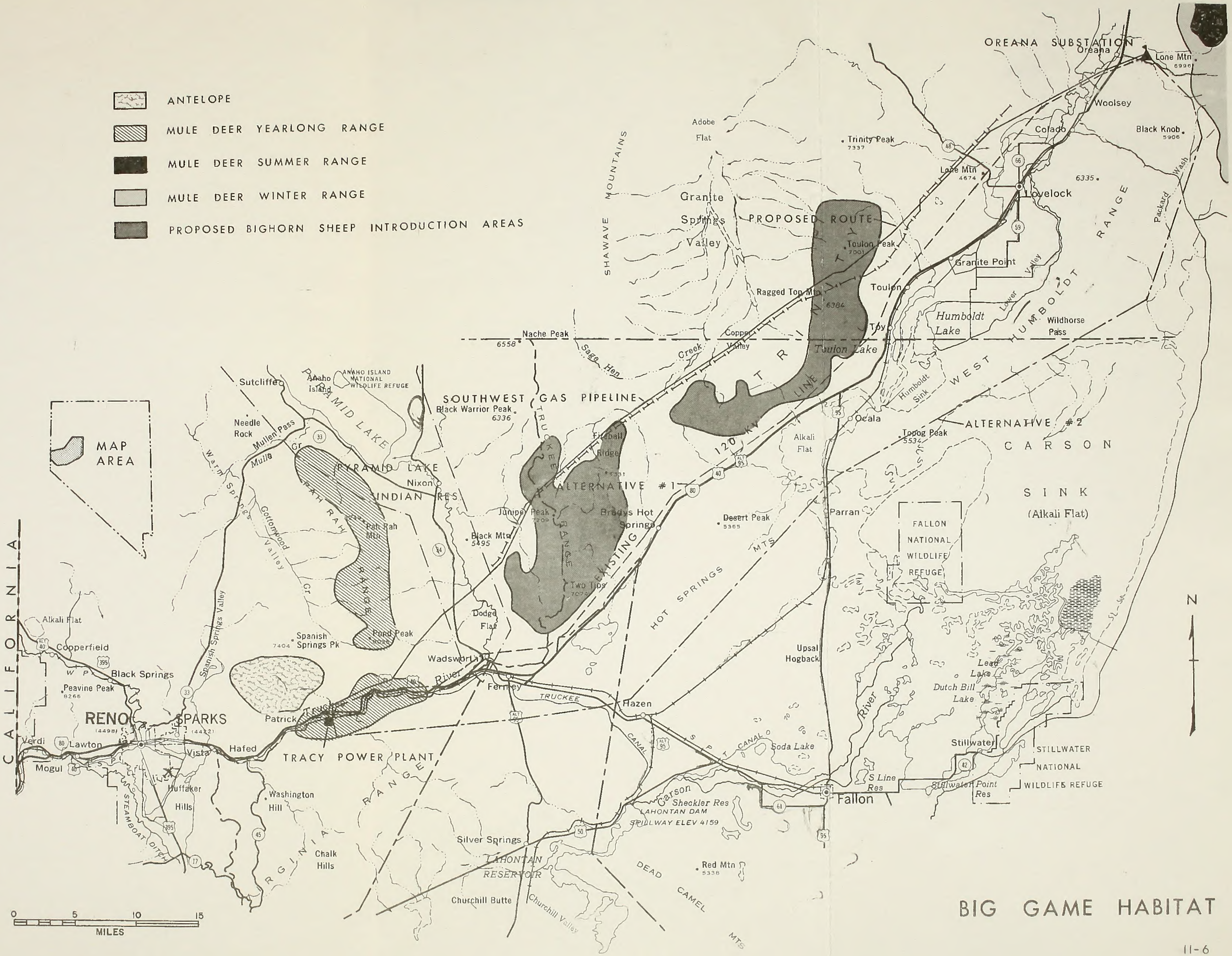
Wildlife game species in the study area include antelope, mule deer, rabbits, sage grouse, pheasant, quail, chukar, mourning dove, and numerous species of ducks and geese. Crucial wildlife habitat areas include the large marsh habitats, nesting and wintering raptor habitat areas, and proposed bighorn sheep re-introduction areas. Fisheries habitat for game fish is mainly limited to the Truckee and Humboldt Rivers.

(a) Mammals

Mammals vary from very limited big game species to shrews, bats, weasels, cats, rodents, and rabbits (See Map II-6 and Appendix 3-C). Mule deer populations are very limited and are located along the Truckee River, Pah Rah Mountains and in the Indian Peak and Humboldt Mountain area just east of Oreana. A small population of antelope are occasionally sighted in the Spanish Springs Peak area. The Truckee Range has been identified as a potential bighorn sheep introduction site, as this was historic sheep habitat. Rodent and rabbit populations are widespread throughout the area, with significant populations in the vicinity of the marshes, Humboldt and Truckee Rivers, and agricultural lands in the Fallon area. Rodent and rabbit populations are considered significant as a prey base for the raptors (birds of prey) and predatory mammals, and as



WILD HORSE AREAS



BIG GAME HABITAT

a potential source of damage to the agricultural crops.

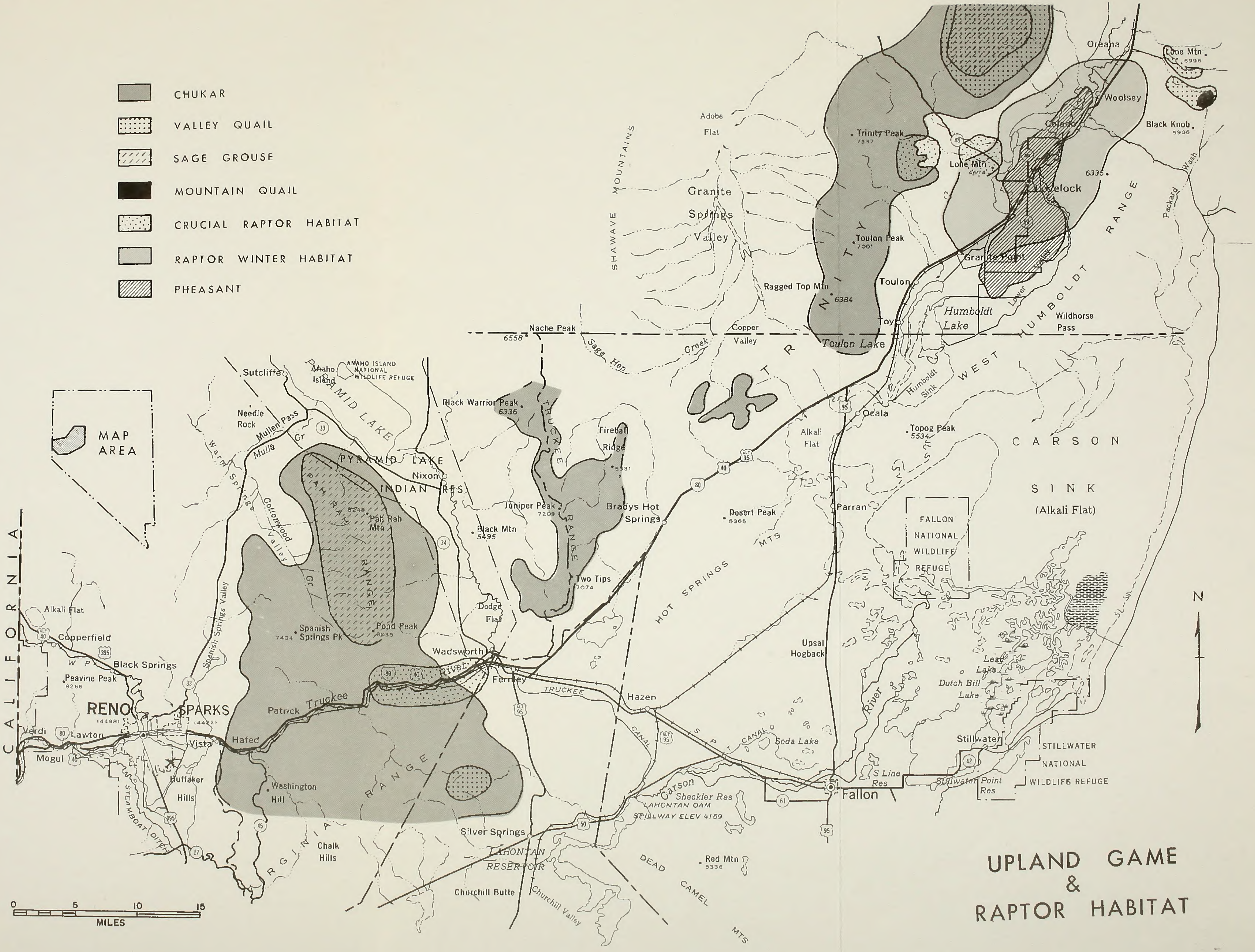
(b) Birds

A large variety of bird species occupy the study area during one or more seasons of the year. The largest group of birds in the area are the passerine songbirds with the most common species being the horned lark, bluebird, and the sparrows. (See Appendix 3-B).

Five species of upland game birds inhabit the area (see Map II-7). These include sage grouse, chukar, quail, mourning doves, and pheasants. No critical sage grouse habitat has been identified within the area. Within the respective habitat areas, water sources are critical habitat for many small game species, such as mourning doves, quail and chukar partridge.

There are a number of raptors (birds of prey) using the study area. Critical raptor nesting habitat exists in the Wadsworth area of the Truckee River, and the Lone Mountain vicinity. Critical raptor winter habitat is located in the Lovelock vicinity of the Humboldt drainage. Golden eagles and prairie falcons are known nesting species, while the southern bald eagle is an occasional wintering species. The peregrine falcon is occasionally sighted in the area and may nest in the vicinity of Pyramid Lake and the marsh complex.

Although waterfowl habitat is limited in Nevada, the study area includes, or is adjacent to, three prime water fowl harvest areas managed by the Nevada Department of Fish and Game and two critical waterfowl habitat areas managed by the U.S. Fish and Wildlife Service. (See



UPLAND GAME & RAPTOR HABITAT

Appendix 4-A for acreage and harvest data.) Waterfowl also use the Truckee and Humboldt Rivers for nesting and staging areas. Numerous species of shore and marsh birds also utilize the study area. (See Appendix 4-B, Non-Game Bird Inventory).

Canada geese are the most common of the species of geese using the area. Redheads, cinnamon teal, and ruddy ducks are the main nesting waterfowl species found on the area, while gadwall, mallard, and pintail make up the bulk of the other nesting species on the area. (See Appendix 4-C, Breeding Pair Count).

(c) Amphibians and Reptiles

Numerous amphibians and reptiles are known to inhabit the area (See Appendix 5-A). Habitat for these species is found throughout the area. None of the amphibians or reptiles are considered threatened or endangered. The wet meadows, marshes, and ponds along the Truckee and Humboldt Rivers are critical habitat for amphibians, while reptiles use nearly all other habitat types within the area.

(d) Fish

Within the area, fisheries habitat is mainly confined to the Truckee River, the Humboldt River below Rye Patch Dam, Pyramid Lake, and Fernley, Humboldt and Stillwater Wildlife Management Areas. Known fish species which occur in each of the above list areas are shown in Appendix 5-B. (See Map II-8.)

Water quality, available water flows, dissolved salts and high water temperatures are the major problems in the area's fisheries. The large number of introduced warm-water game fishes is reflective of these fisheries habitat restrictions.

Appendix E-A for acreage and harvest data.) Waterfowl also use the Truckee and Humboldt Rivers for nesting and staging areas. Numerous species of shore and marsh birds also utilize the study area. (See Appendix E-B, Non-Game Bird Inventory.)

Upland game are the most common of the species of game using the area. Pheasant, California quail, and mourning doves are the main nesting [illegible] species found on the area, while [illegible] and [illegible] tail make up the bulk of the other hunting species. (See Appendix E-C, Hunting Take Chart.)

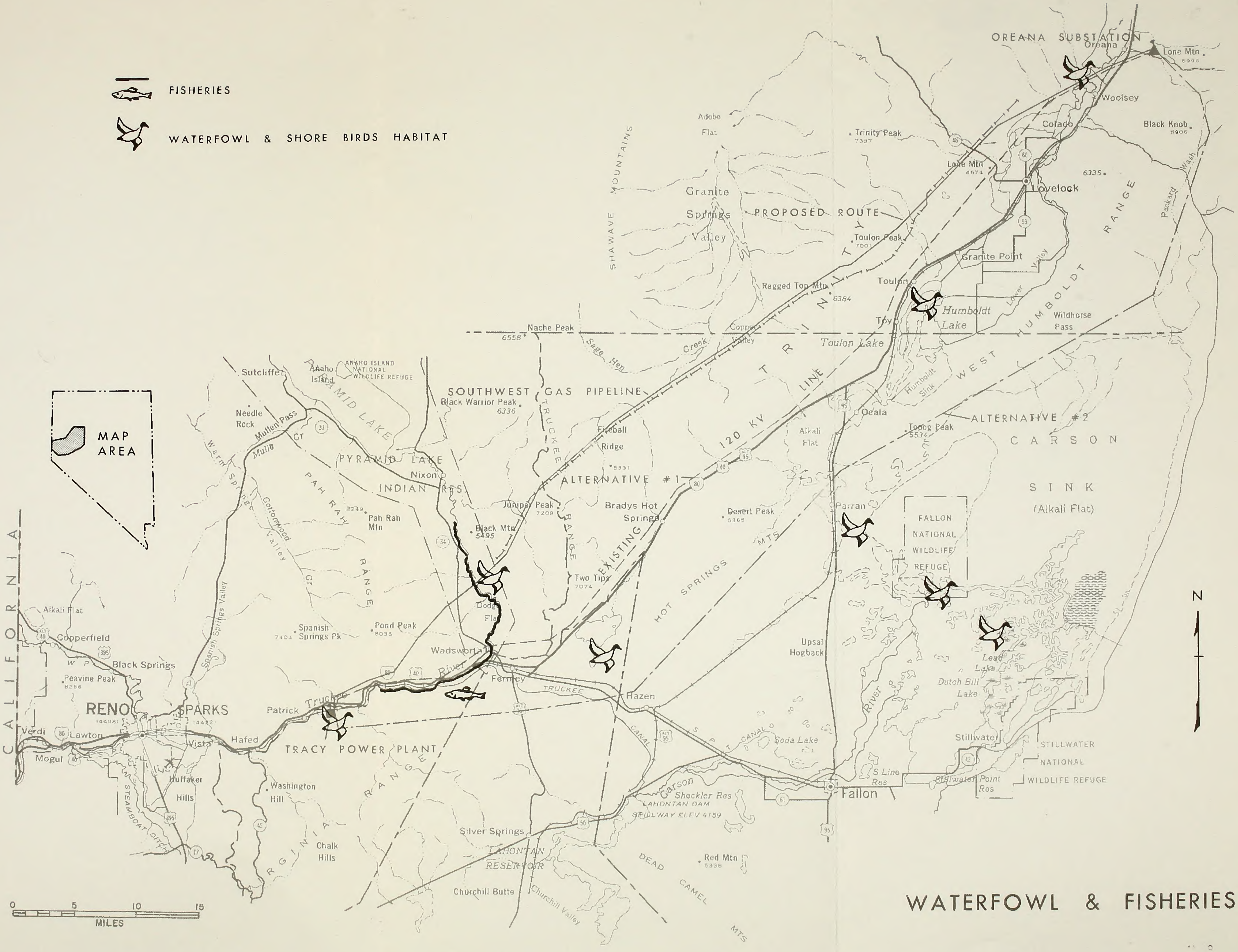
(7) Amphibians and Reptiles

Numerous reptiles and [illegible] to inhabit the area [illegible] are found throughout the area. None of the [illegible] are considered threatened or endangered. [illegible] ponds along the Truckee and Humboldt [illegible] [illegible] while reptiles the [illegible] the area.

(8) Fish

Fishes are [illegible] abundant in the Truckee River, the Humboldt [illegible] reservoirs, lakes, and [illegible] [illegible] game fish species which occur in each of the bodies [illegible] in Appendix E-D. (See Map II-6.)

Water quality, available water flows, siltation and high water temperatures are the major problems in the area's fisheries. The large number of introduced warm-water game fishes is reflective of these fisheries habitat restrictions.



WATERFOWL & FISHERIES

(e) Invertebrates

Insects, numerous in the study area, can be broken into two groups: chewing insects and sucking insects. The chewing insects (grasshoppers, ants, etc.) are more apparent in their environmental effects and presence than the sucking insects. The chewing insects constitute the majority of the class. Both classes contain predatory species which prey on other insects, and therefore, may be a benefit to man.

(4) Man

Man's presence in the study area has had, and is still having, an effect on all animals from the largest carnivores to the smallest invertebrates. Adverse past effects are typified by the elimination of the bighorn sheep and the severe reduction of the Pyramid Lake cutthroat fisheries. These effects of man are moderate at present due to the low human population inhabiting the area.

Other activities of man which impact the environment, or have the capability of producing impacts, include recreational uses such as hunting and fishing, grazing of livestock over the majority of the area, predator control to protect livestock, and spraying of crops to eliminate damaging insects and parasites.

Water from the Humboldt and Truckee Rivers is utilized to support irrigated crop production in the Lovelock and Fallon areas. These crops provide food and shelter for a variety of living creatures. Excess flows and waste water from the irrigation projects help to maintain water levels on five wildlife management areas which provide aquatic habitat.

3. Ecological Interrelationships

Ecological interrelationships are comprised of the relationship of the biotic communities reacting together as a unit and to the basic non-living components, to include sunlight, air, water, and soil. The interrelationship of living components within the physical environment is depicted in Figure II-1.

a. Ecological Processes

The functions of an ecosystem are dependent upon the primary producers (green plants) that convert nutrients, water, and solar energy directly for the synthesis of plant food. The consumers (herbivores) utilize the producers (plants) and they are in turn utilized by predators and man. The decomposers are primarily bacteria and fungi that break down plant, animal, and debris materials which are then recycled through the system. (See Figures II-2, 3, 4.)

Within the study area, severe climatic limitations (chiefly low and erratic precipitation) have resulted in biological constraints preventing an increase in vegetative production for enhancing the food chain and energy transfer.

The basic biotic community of the subject area is the cold desert biome. Climax shrub species found in the study area include big sagebrush (Artemisia tridentata), big greasewood (Sarcobatus vermiculatus), dryland greasewood (Sarcobatus baileyi), and shadscale (Atriplex confertifolia).

Historically, perennial grasses made up a significant part of

the cold desert biome's vegetation. Overgrazing, fire, and climatic changes have drastically reduced the more palatable vegetative species. The process of natural revegetation or successional recovery on deteriorated lands may take decades to again reach climax. When dominant (climax) species and their understory communities are disturbed and plant succession is set back, a stand of invaders such as cheatgrass or halogeton will generally become established.

This arid region generally has a sparse vegetative cover which contributes little humus or organic material to the soil. Most of the area remains in a native state and is primarily used for livestock grazing, wildlife habitat, and increasingly for recreational pursuits. (See Figure II-5 - major plant communities and their elevational distribution within the study area.)

Because of the delicate ecological balance which exists in the cold desert ecosystem, many plant and animal species are highly specific as to what conditions they can successfully tolerate; however, a few are adaptable to a wide variety of conditions.

The extreme short supply of water due to low precipitation has resulted in the growth of low-producing drought-resistant vegetation. The short supply of water and low amount of available forage is reflected in a low population of animals due to competition for food.

Animal species have adapted to specific situations. Predator population levels, raptors and carnivores, are dependent on the current levels of prey species. Some animal species have specific

FIGURE II-1 - BASIC ENVIRONMENTAL INTERRELATIONSHIPS

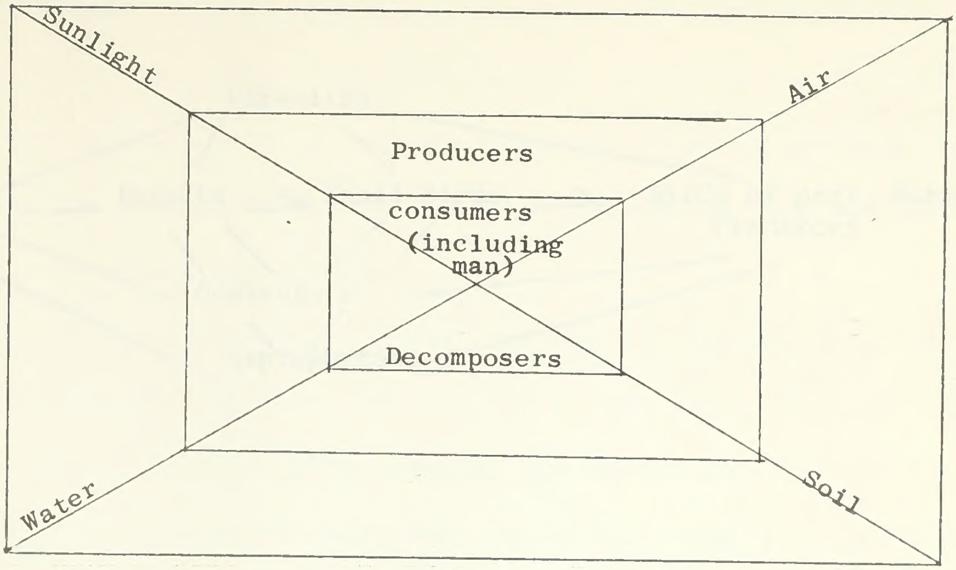


Figure II-2. Simple food chain illustrating the trophic levels (Adapted from Leutscher, 1969)

Third Consumer - - - Birds of prey, Mammalian predators

Second Consumer - - - Insectivorous Birds

First Consumer - - - Insects

Primary Producer - - Plants

Figure II-3. Pyramid illustrating animal numbers and the inverse relationship to area required (Adapted from Leutscher, 1966)

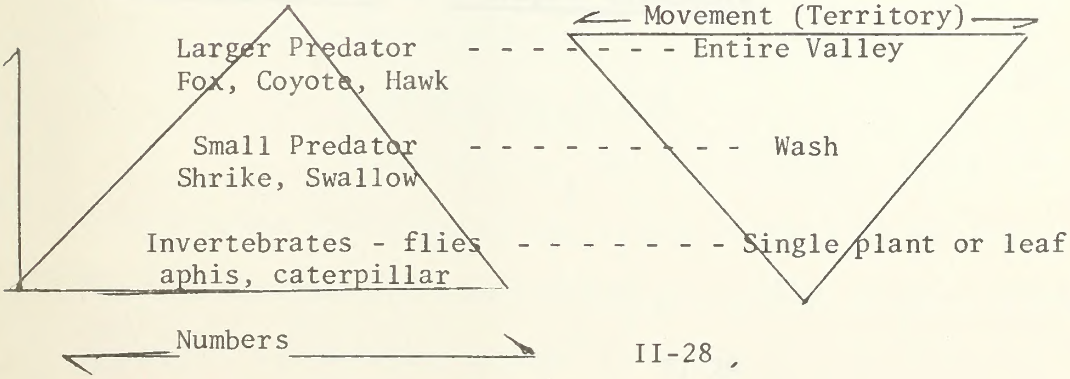


Figure II-4. Food Web (Adapted from Leutscher, 1969)

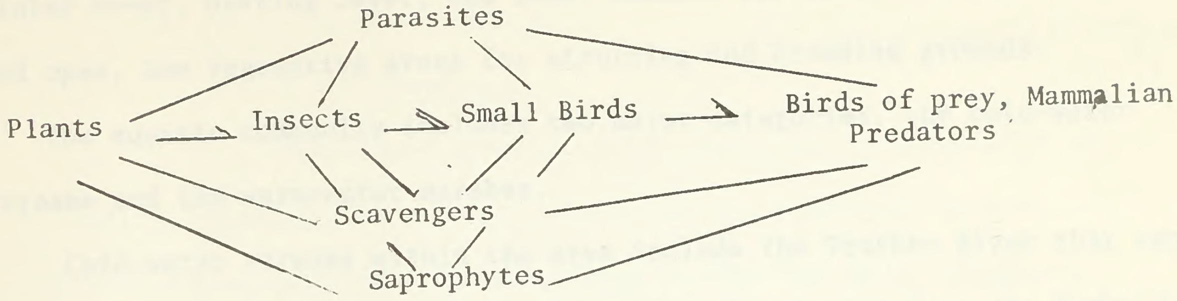
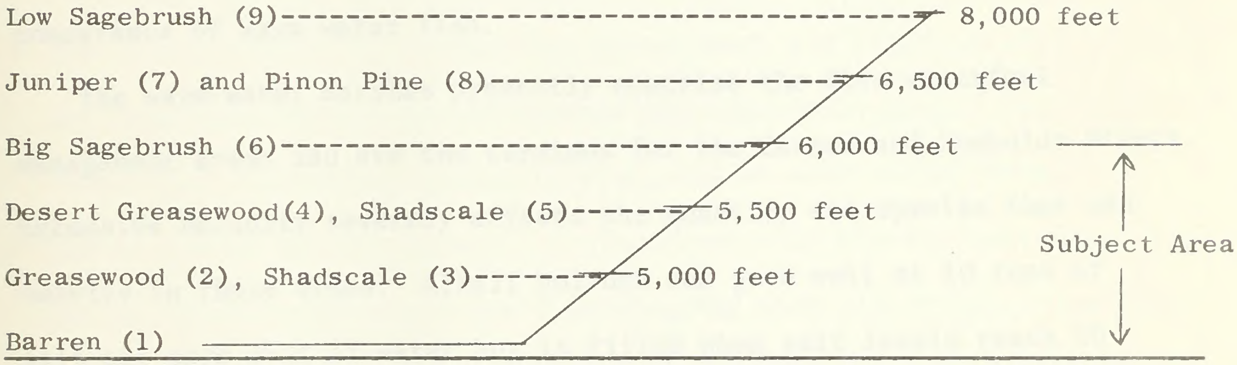


FIGURE II-5 - MAJOR PLANT COMMUNITY - ELEVATION RELATIONSHIPS



1) Alkaline lake beds, 2) _Sarcobatus vermiculatus_

3) _Atriplex confertifolia,_ 4) _Sarcobatus baileyi_

5) _Atriplex confertifolia,_ 6) _Artemisia tridentata,_ 7) _Juniperus osteosperma,_

8) _Pinus monophylla,_ 9) _Artemisia arbuscula_.

vegetative requirements such as those necessary to maintain a sage grouse population. Sage grouse requirements include sagebrush for winter cover, nesting cover, and food, meadows for brood rearing areas and open, low vegetative areas for strutting and breeding grounds.

The aquatic community includes two major categories, the cold-water streams and the warm-water marshes.

Cold-water streams within the area include the Truckee River that empties into Pyramid Lake and the Humboldt River that terminates into the Humboldt Sink. The aquatic habitat of both rivers has become degraded due to siltation, other pollution, water diversion, and stream bank deterioration. Where these streams once held significant populations of cutthroat trout, the Truckee River still maintains a significant rainbow and brown trout fisheries. The Humboldt River is now only capable of producing limited trout with a preponderance of warm water fish.

The warm-water marshes presently comprise the five waterfowl management areas and are the terminus for the Carson and Humboldt Rivers. Excessive salinity severely affects the quantity and species that can survive in these areas. Alkali bulrush can grow well at 10 tons of salt per acre foot of water but is killed when salt levels reach 20 tons of salt per acre foot. Widgeon grass requires salt concentrations in excess of 13 tons and has been found growing in concentrations in excess of 85 tons of salt. Cattail growth is inhibited at concentrations of 7 tons of salt per acre foot of water. Many of these plants provide habitat and food for waterfowl.

b. Biogeochemical Cycles

Biogeochemical cycles are those in which materials flow from the non-living to the living and back to the non-living again. The more important of these include the carbon, oxygen, nitrogen, hydrologic and nutrient cycles.

4. Human Interest Values

a. Visual Resource

The visual resource of a landscape is identified as the unique combination of visual features: land surface, vegetation, and structures; and their relationship to the four basic elements of form, line, color, and texture.

The overall visual strength and character of the study area is a strong contrast between the horizontal expanse of the desert valley floors and a rapid transition to the rolling foothills and more rugged mountain elevations. The slow rise from valley bottoms express color and textural contrasts among the sparse tufts of gray-green vegetation, occasional green marsh and light-colored dry lake beds, upward to the steeper and more undulating darker foothills. This color change is most evident when viewed from higher elevations and appears as linear patterns across the valley bottom and intermediate slopes, contrasting with the strong horizontal lines of five ancient lake terraces that contour the many foothills. A panorama of basin and range topography is observed at the higher elevations, expressing a wide range of form and color variation and contrast.

Green pastures and small groves of cottonwoods line the banks of the Truckee River through the entire area, dissipating a few miles above Pyramid Lake where accelerated erosion and over grazing prevent growth.

Southwest of Lovelock the texture and color of the vegetation slowly change from plaid patterns of rectangular green and gold fields to salt shrubs to wet wasteland. The Humboldt spreads out across this flat expanse and sinks into the substratum.

Several man-made intrusions are visually apparent in this landscape. Generally they follow the rivers and established travel zones to population centers of Wadsworth, Nixon, Fernley, and Lovelock. Power transmission lines and towers, highways, straight-line railroad beds, road scars, etc. fail to borrow from the naturally established form, line, color, and texture of this characteristic landscape.

Ranch developments are typically located on the intermediate slopes although the visual impacts of the buildings, trees and green meadows seem to generally remain subordinate to the existing landscape character.

Perhaps the most noticeable man-made visual intrusions are those associated with mining activities. Not only are many exploration sites and access road scars visible, but structures such as the diatomite plant in Lovelock and the diatomite and cement plants in Fernley virtually dominate the natural landscape characteristics in their particular locations.

Based on the visual resource inventory and evaluation system as explained in BLM Manual 6300, three visual resource management classes have been identified in the subject area. The analysis from which these classes have been taken appears in Appendix 6-A of this document. It is suggested that this analysis be reviewed in order to understand the basic premises, criteria and methodology of the visual resource inventory and evaluation system.

The Classes are as follows:

Class II - Highly Significant

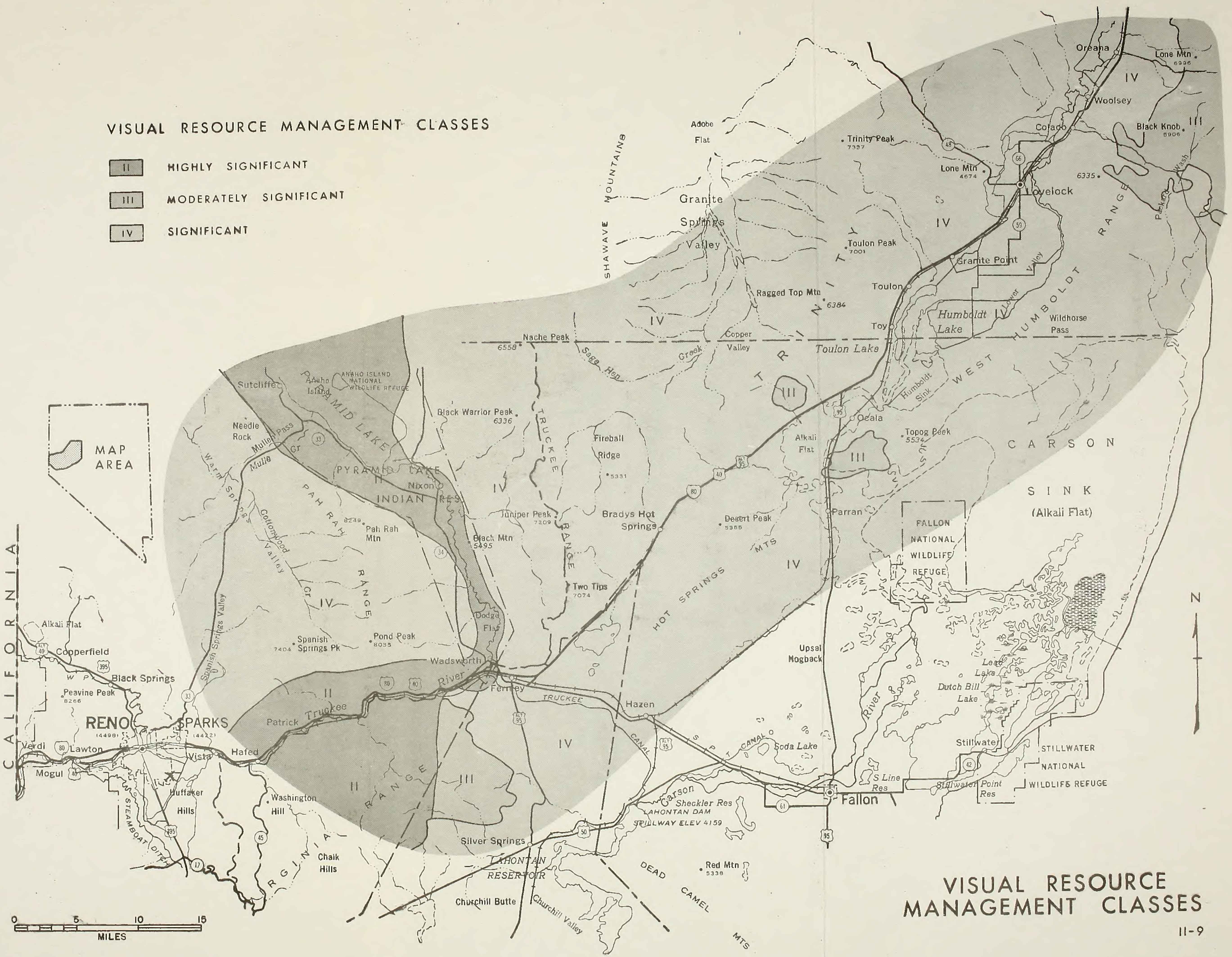
Class II identifies highly significant visual resource areas, due to their high sensitivity levels and important scenic values. Specifically these areas, delineated on map II-9, are: A large portion of the northern Virginia Range extending north across the Truckee River and Interstate 80, continues to follow the river to the junction of Highway 34 and in a 1-1/2 mile swath north to divide a large area within the Pyramid Lake Indian Reservation, parts of the Pah Rah Range, Pyramid Lake and several miles along Highway 33 including Mullen Pass.

Class III - Moderately Significant

Class III areas, although not as important as Class II, are still considered moderately significant because of their critical visual resource values. The Class III areas are limited to the following locations: A 25,000 acre area of the Virginia Range Foothills located north of Churchill Butte and west of Silver Springs, two smaller areas on either side of Interstate 80 approximately midway between Fernley and Lovelock, and a large portion of the Humboldt Range extending along the east side of Interstate 80 between Lovelock and Oreana.

Class IV - Significant

The majority of the study area is included in visual resource Class IV. This class with lower sensitivity and scenic values can be described as the broad, flat expanse of lower elevation country with little variation in topographic, vegetative or water features and generally lacking the contrast in the basic elements of form, line, color and texture evident in the other management classes.



VISUAL RESOURCE MANAGEMENT CLASSES

b. Outdoor Recreation

The study area appeals to the recreationist who enjoys unlimited views, open space, and freedom from the sights, smells, and sounds of civilization.

This back country surrounds the major travel zones and provides a variety of desert biome related recreation opportunities for its visitors.

The study area is an immediate threshold to the desert for those visitors from the West. Most of the use for all recreation activities is generated from the Reno-Sparks area.

(1) Camping-Picnicking

Pyramid Lake and Rye Patch Reservoir receive the heaviest camping and picnic pressure within the study area. The large bodies of water surrounded by the vast expanse of the desert attract campers and picnickers as a variety of water-related recreation activities are available.

Two roadside stops along Interstate 80, one at the Interstate 80 and U.S. Highway 95 interchange, and the other just east of Lovelock, receive heavy day-use pressure, particularly during the summer months.

Virtually every mountain range has primitive campsites in many of their canyons and foothills. They are most typically located along dirt roads and close to water sources and shade trees.

(2) Fishing

Heavy fishing activity is concentrated mainly in three localities; Pyramid Lake, Rye Patch Reservoir, and the Lower Truckee River.

Pyramid Lake is considered to be a cold water fishery where anglers attempt to bag large Lahontan cutthroat trout.

The Rye Patch area to include Pitt-Taylor Diversion Reservoir

and the Humboldt River just below Rye Patch Dam produce both warm and cold water fish, as does the lower Truckee River.

The angler success in all these areas has improved substantially due to restocking.

(3) Hunting

Most of the major mountain ranges are utilized for hunting, both upland and big game. Other than waterfowl hunting, which is considered fair to good in the Humboldt and Carson Sink localities, hunter success has not been good in the past few years. This is largely due to depleted game populations brought about by deteriorating habitat quality and increasing hunter pressure.

(4) Rockhounding

Within any given location, rockhounding opportunities are present. Usually if certain types of rocks are desired, the rockhounding recreationist talks to local citizens involved with rock collecting to find more specific locations.

(5) Sightseeing

Sightseeing is recognized as the nation's most popular outdoor recreation activity. Vistas, geological, botanical, or zoological sightseeing opportunities are all present within the study area.

Columnar basalts, large granite outcrops, tufa parks and hot springs are examples of geological sightseeing found within the study area. (Some are discussed at more length under c.(1) Educational/Scientific.

Most of the area's major valleys and mountain tops are accessible by four-wheel drive vehicle to afford an overwhelming view of the landscape which can be seen up to 100 miles or more, depending on specific location and weather conditions. Major changes in geological and botanical formations and types can be observed from these vistas.

One of the most common zoological sightseeing opportunities is viewing wild horses. Many people enjoy seeing and knowing that wild horses still exist on the Open Range.

(6) Specialized Activities

Due to the close proximity of population centers, the use of, and interest in off-road vehicle (ORV) activity is increasing within the study area. Alkali Flat immediately south of Interstate 80 and west of U.S. Highway 95, shows signs of heavy off-road vehicle use. Although much of this activity appears to be at a non-competitive level, requests to BLM for competitive events are increasing each year. Special areas used and considered for off-road vehicle events are the Winnemucca dry lake locality, and a considerable acreage northwest of Brady Hot Springs.

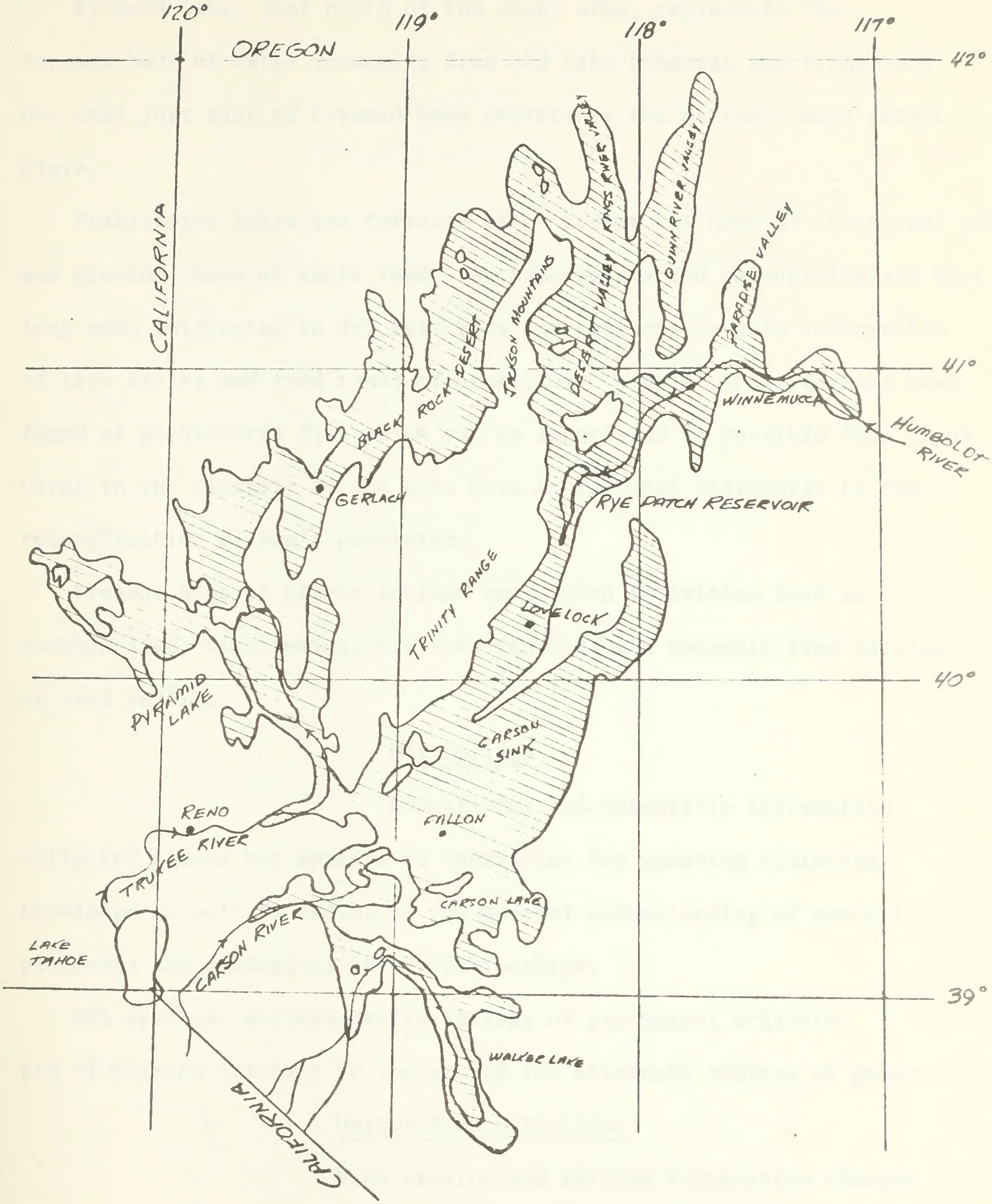
c. Sociocultural Values

(1) Educational/Scientific

(a) Geological

Lake Lahontan

Lake Lahontan was a large fresh water lake covering about 8,000 square miles of northwestern Nevada thousands of years ago, during the Wisconsinian state of the Pleistocene epoch (Map II-10). The most obvious evidence of the lake's existence is recorded in the numerous wave cut terraces and lake bars. The wave cut terraces are most noticeable on the eastern slopes of the Trinity Range and on the slopes of Lone Mountain and Granite Point. They



▨ LAKE LAHONTAN

MAP II-10

record the different lake levels; the highest was an altitude of 4,380 feet.

Pyramid Lake, just north of the study area, represents the largest body of water remaining from old Lake Lahontan and Winnemucca Dry Lake just east of Pyramid Lake represents the nation's most recent playa.

Prehistoric lakes and terraces often became the home of aboriginal people and provided much of their food. Archaeologists and paleontologists have long been interested in dry lake beds and terraces to gain information of life styles and food types of prehistoric people. Fossils have been found of prehistoric fish which can be associated to possible food types. Caves in the vicinity of the area have contributed nationally to the reconstruction of man's prehistory.

Present uses of playas include recreation activities such as rockhounding, sightseeing, off-road vehicles and recently land sailing or sand sailing.

Hot Springs

Educational and scientific information collected around hot springs is beneficial for updating historical knowledge as well as adding to the general understanding of natural processes and ecological interrelationships.

Hot springs, surface manifestations of geothermal activity, are of current interest in the search for alternate sources of power.

Unique Rock Formations

Wind erosion and extreme temperature changes combined with rock composition are the main factors that develop unique rock formations. A good example of this can be found in the columnar

basalts at the southern end of the Trinity Mountains. Basalt flows have cooled to form distinctive shrinkage cracks. These cracks weather to form the scenic six-sided columns seen at that location.

(c) Archaeological

In comparison to the Great Basin Region as a whole, the study area has undergone numerous archaeological investigations. These include excavations of such nationally significant locations as the Humboldt Sink, Pyramid Lake, Winnemucca Lake, and Truckee Meadows.

The applicant, Sierra Pacific Power Co., contracted an archaeological reconnaissance of the proposed corridor with Mary Rusco and Evelyn Seelinger of the Nevada State Museum. References will be made to their findings throughout this analysis. See Appendix 6-B, summary of archaeological findings.

Through discussion with Bob Donlevy of the Bureau of Indian Affairs, Dodge Flat, on the Pyramid Lake Indian Reservation, was identified as having unmarked, but known, Indian burial sites.

In this area of the Great Basin there is evidence for at least 11,000 years of native American occupancy. This occupancy is usually divided into three periods of time:

Early Man

Early man lived along the ancient terraces of Lake Lahontan, which are quite noticeable in the Carson and Humboldt Sinks. Heavily weathered stone implements are associated with these ancient lake dwellers who exploited the game potentials of Lake Lahontan during terminal and post-pleistocene times 11,000 to 8,000 years ago.

Desert Archaic

About 8,000 years to 3,000 years ago, the Desert Archaic or Desert Culture is presumed to have existed. The people of this Great Basin period are believed to have lived in small groups and exploited a wide range of resources.

In the Humboldt Sink numerous important Desert Archaic sites exist including Leonard Rock Shelter (a National Register Site), Lovelock Cave (possibly the most famous archaeological site in Nevada), the Humboldt lakebed site, Ocala Cave, and Humboldt Cave.

Late Prehistoric Period

This period would cover the segment of time lasting from about 2,000 years ago to the white contact period of the 19th century. During this time the ancestors of the modern-day Paiute and

Shoshone began exploiting a wide variety of resources. Perhaps even some limited agriculture was practiced.

Appendix 6-B lists the cultural findings of the archaeological reconnaissance performed on the proposed corridor. Sites catalogued from Region I to III of that report are included with the exception of the sites located in Sacramento Canyon.

A total of 45 sites are recorded along the proposed right-of-way, Tracy to Oreana. The archaeological significance of each of the three regions covered by the cultural report prepared by the Nevada State Museum is in Appendix 6-C.

Overall, the archaeological knowledge of this area can be summarized as sketchy. The potential for archaeological inquiry is great. Archaeological sites will occur in association with almost all live surface waters. This applies as much to hot springs as it does to cold waters. In fact, many of Nevada's best archaeological sites are associated with hot springs.

(c) Historical

Railroads and an interstate highway cross Nevada through the Humboldt River Valley where early explorers, beaver trappers, pioneers, and fortune hunters traveled. The names of Jedadiah Smith, Peter Skene Ogden, Milton Sublette, Joseph Walker, Kit Carson, and Thomas McCoy were all associated with beaver trapping parties. From 1825-33 the men of these trapping parties were the first men to follow the Humboldt River. The lazy winding Humboldt was first called the Mary's River in honor of Ogden's Indian wife.

Geographer John C. Fremont, who was exploring this territory for new routes to the Pacific, renamed the river Humboldt after the Baron Alexander von Humboldt who had scribed Fremont's maps for the 1843 expedition. Fremont returned to the Great Basin country in 1846 with Carson and Walker as guides.

Before Fremont, John Bidwell led the first immigrant party across the overland route to California in 1841. Many more followed, including the ill-fated Donner Party in 1846.

The greatest hardship for the wagon trains was the crossing of the 40-mile desert west of the present community of Lovelock. So anxious were the travelers to pass this "useless God-forsaken country" that its mineral wealth went unnoticed until 1861. First discoveries of gold and silver in the Humboldt Mountain Range led to settlements at Humboldt City, Star City, and Unionville in the same year. By 1864, a mining district was established in the Humboldt Range and other towns sprang up.

The first transcontinental railroad passed through Big Meadows and French Ford in 1867-68. Those two communities were then renamed Lovelock (after a prominent settler George Lovelock) and Winnemucca (for the celebrated Paiute Indian Chief). With the railroad came hundreds of Chinese who became miners and farmers.

Present day Humboldt and Pershing Counties were one political unit with the first county seat established in Unionville in 1862. One of Unionville's more famous characters was Mark Twain, who as a young optimistic miner, took up residence there in 1864.

As Winnemucca continued to grow in importance as a hub of commerce, it won the county seat in 1873. Humboldt County did not become divided until 1919, when the southern portion became Pershing County (named for General John J. Pershing).

(d) Archaeological/Historical Sites

National Register: In accordance with procedures of 36 CFR 800.4, the National Register of Historic Places through August 5th was consulted. The following archaeological value was listed for this area:

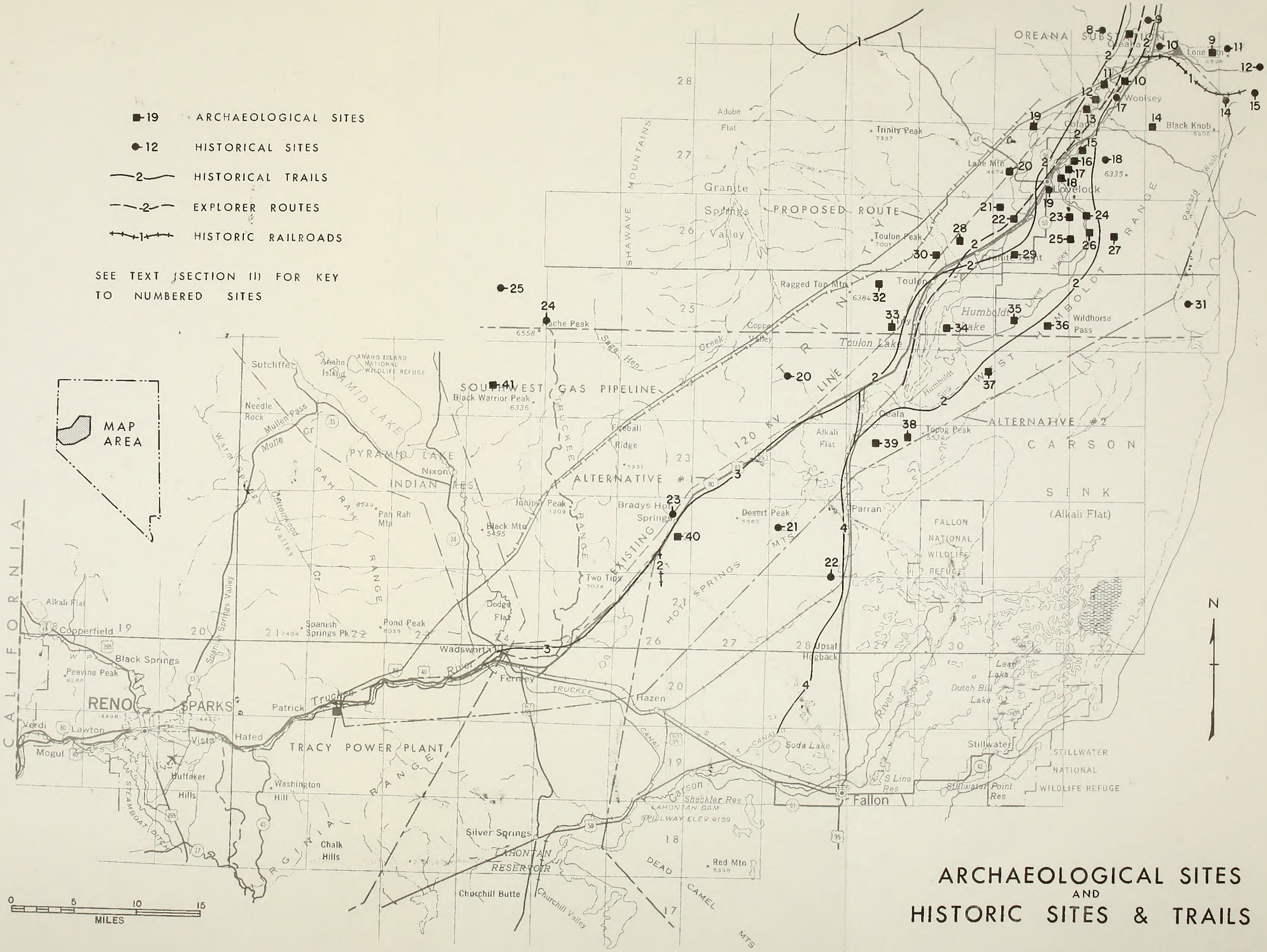
Leonard Rockshelter - T. 25 N., R. 31 E., Sec. 28 and 22. Pershing County 12 miles south of Lovelock.

Humboldt Cave - T. 23 N., R. 29 E., Sec. 9, located 18 miles southwest of Lovelock, has been nominated for inclusion to the National Register.

At present, no historical values are listed or being considered.

Inventoried Archaeological and Historic Sites and Trails

Appendix 6-D represents those areas, sites, and trails of known archaeological and historical value. See Map II-11.



ARCHAEOLOGICAL SITES AND HISTORIC SITES & TRAILS

5. Social-Economic Interests [1]

a. Population

The general area of the proposed power line along with the two alternative routes includes: five counties (Washoe, Storey, Lyon, Churchill, and Pershing), covering about 19,000 square miles containing more than 144,000 people. About 86 per cent live in and around the Reno-Sparks urban complex. The remaining population is located in the rural communities of Wadsworth, Fernley, Hazen, and Lovelock.

b. Employment and Income

Employment and income within the study area is rather diversified. The Reno-Sparks area (Washoe-Storey Counties) while the remainder of the area is more traditionally oriented toward mining (Lyon County) and agriculture (Churchill and Pershing Counties). It is not unreasonable to expect that this employment/income mix vis-a-vis tourist related services and traditional mining/agriculture activities will remain the same in the foreseeable future. The only changes envisioned at the present time in this employment structure are an expanding mineral industry in Pershing, Lyon and Churchill Counties. (See Appendix No. 8.)

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[1] Social-Economic data extracted from the "Economic Profile for the Bureau of Land Management in Nevada, 1974."

c. Standard of Living

The social well-being of the study area can be measured by the percentage of families with income less than poverty level, and the percentage of transfer payments paid to counties. 1/ Nearly 30 per cent of Churchill County's estimated personal income is derived from some sort of Government transfer payment, and more than 10 per cent of the families in the county are earning less than poverty level incomes. Pershing County earns more than 43 per cent of its estimated personal income from agriculture and mining activities and has over 11 per cent of its families earning below the poverty level -- the highest percentage in the five county area. In contrast -- Washoe County with less than 1 per cent of its estimated personal income derived from agriculture/mining also has the lowest percentage of transfer payments and the highest family median income. This latter point reflects the fact that more than 50 per cent of Washoe County's employment works in tourist-related services which has higher payrolls than those employed in traditional activities. (For greater detail, see the Nevada Economic Profile, tables on income-employment-poverty status by county.)

1/ Transfer payments data taken from - Federal Outlays in Nevada, 1970, Office of Economic Opportunity. Included as part of transfer payments are social security payments, Federal disability insurance fund, old age assistance payments, unemployment insurance, and Civil Service retirement. See Page A-38a of the Nevada State Economic Profile for further delineation of transfer payments.

d. Housing 1/

The availability of housing is one indicator of a region's growth and potential for growth. In the study area, authorized housing starts for the years 1970 through 1974 indicate a considerable drop in construction activities. This reduction took place in both single family and apartment units. Washoe County (1973-74) had the highest percentage decrease in total units -- from 3,434 to 1,163 units for a 66 per cent decrease. Churchill County had the next highest decrease, from 71 to 56 units for a 21 per cent drop. Pershing County had no construction starts in 1974. Lyon County registered a 10 per cent increase in housing starts over the 1973 figure of 68. Overall it is interesting to note that this drop, from 1973-74, appears similar to the one that took place during 1963-64, 10 years ago. At that time, there was also a nationwide recession taking place.

e. Taxes 2/

Although the study area encompasses five counties which levy or may levy an ad valorem tax rate, the area also includes five school districts, five cities (Reno-Sparks counted as two); three unincorporated towns, two in Storey County and one in Lyon County; 17 special ad valorem districts, five in Lyon County, two in

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1/ Authorized housing includes only housing units for which a building permit was issued. Housing units classified as mobile homes are generally not included. Data from "Nevada Planner", Vol. 6, No. 2, March, 1975, Housing Units authorized for Nevada.

2/ Data extracted from Local Government Red Book and Ad Valorem Tax Rates Budget Summaries for Nevada Local Governments, Fiscal Year 1974-75.

Pershing, and 10 in Washoe County; two special non-ad valorem districts, one in Washoe and one in Pershing County; and two inactive districts, both in Washoe County. In all, the total assessed valuation of the study area is nearly $1 billion. Washoe County accounts for nearly 85 per cent of the total.

Table II-3 - Assessed Valuation of Study Area by County

County	Assessed Valuation 1/
Washoe	$878,768,450
Storey	7,808,305
Lyon	75,796,391
Churchill	47,406,976
Pershing	$ 29,808,887
Total	$1,039,589,009

6. Local Regulatory Structure

a. Local Plans

See Table II-2 for types of local planning now being done in the study area. The planning systems now available within the study area are significant in that current plans reflect attitudes of increasing concern toward stability and growth.

b. Federal Agency Plans

(1) Bureau of Land Management

BLM has the lead role in evaluating this proposed power line project because the majority of the area crossed

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1/ Assessed valuation is 35% of the true cash value of all personal property in the five county area. The maximum rate which either the county or sub-county taxing entities can tax is 5% (total combined unit rate).

TABLE II-4 - PLANNING STRUCTURE BY COUNTY 6/

County	Type(s) of Plan	Planning Structure	Planning Budget 1974-5 and Planning Staff
Washoe	Zoning Ord., subdivision ord.; Gen. plan of development, open space; master plan.	Regional Planning Commission Washoe Council of Governments	$252,391 - 13 $1,603,000 - 7
Storey	Zoning ord.; subdivision ord., Master Plan in Planning Process	Planning Commission	$1,500 - 0
Lyon	Zoning ord., subdivision ord., master plan	Planning Commission	$5,000 - 1
Churchill	Subdivision ord., land use ord.	Planning Commission	$10,000 - 2
Pershing	Subdivision ord.; master plan in process. Plans for comp. planning program.	Planning Board	$13,000 - 1

6/ Data extracted from Directory of Local Planning Organizations, Governor's Office of Planning Coordination, State of Nevada, May 1975; not included are town and city plans within the five county area.

by the proposed route and the two alternatives cross national resource lands administered by BLM. (See Table 1-1, Section 1.)

The proposed route and the two alternatives cross four BLM planning units in the Carson City and Winnemucca BLM Districts.

Planning Unit	District
Pyramid	Carson City
Fort Churchill	Carson City
Blue Wing	Winnemucca
Sonoma	Winnemucca

The lands in these planning units have been classified for retention and multiple-use management under the Classification and Multiple Use Act of September 19, 1964. Management Framework Plans (land use plans) have been completed for these planning units. The MFP decisions relative to utility line corridors have been considered in the proposed and Alternative route 1 rights-of-way.

(2) Bureau of Indian Affairs

The Bureau of Indian Affairs (BIA) has responsibility for actions occurring on Indian reservation lands. At the present time, BIA is coordinating with the BLM and Sierra Pacific Power regarding the proposed power line which will cross 4.8 miles of the Pyramid Indian Reservation.

Alternative route 1 would cross the reservation for 4 miles near Wadsworth, Nevada.

(a) Bureau of Reclamation

This agency's primary involvement regarding the proposed action concerns a preliminary study of potential agricultural development of the Dodge Flat area on the Pyramid Indian Reservation. Bureau of Reclamation administered land would become extensively involved if Alternative route 1 or 2 is selected.

(b) Department of Housing and Urban Development

This agency is also involved in a preliminary study concerning the feasibility of a housing project in the Dodge Flat area of the reservation.

(3) U.S. Fish and Wildlife Service

This agency could be involved since Alternative route 2 skirts the extreme northwest corner of the Stillwater Wildlife Management Area.

7. Attitudes and Expectations

Attitudes toward the establishment of power lines in a given area are governed by the impact of the line on current and future land uses. The proposed power line and alternatives primarily cross lands on which livestock grazing is the dominant economic activity. Attitudes of the local citizenry toward the action are hard to determine since public interest in the project has been negligible. This fact has been well illustrated by the extremely small turnouts at public meetings conducted by the applicant (Sierra Pacific Power) in the various communities along the proposed electric transmission line.

Although not documented, it is possible the negligible public

turnout can also reflect a positive attitude, in that expectations of increased availability of reliable electrical power is an inherently good action.

Where future land uses may potentially conflict with the proposed power line, attitudes of concern appear, as in the case of the Tribal Council of the Pyramid Lake Indian Reservation. In this regard, the Council has expressed concern, through the BIA, about the routing of the proposed power line through the Dodge Flat area.

8. Hazards to Human and Animal Health and Safety

There are several man-made as well as natural features that have inherent hazards to health and safety within the study area. These are briefly summarized below:

a. Man-made Features

The more obvious include: highways, railroad, unsurfaced roads, industrial sites, communications and electrical lines, fences, and mining activity.

b. Natural Features

The more significant are: natural hot springs, potential for rangeland fires, lakes, deep marshes, rivers, mountain cliffs, and earthquake potential.

ANALYSIS OF PROPOSED ACTION AND ALTERNATIVES

SECTION III

III. ANALYSIS OF THE PROPOSED ACTION AND ALTERNATIVES

A. ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

1. Anticipated Impacts

a. Non-Living Components

(1) Climate

No impacts are expected.

(2) Air Quality

(a) Vehicle Emissions

Some vehicle emissions will be produced during the lifetime of the power line project, but they will be minimal.

(b) Particulate Matter

Dust generation will constitute the most significant assault on air quality, but the magnitude is not expected to be great. As mentioned in the section on existing environment, natural dust generation in this area frequently exceeds the state standards for particulate matter.

Dust production can be expected to occur as a result of several actions: construction, vehicle travel on unpaved surfaces, and wind erosion of disturbed areas.

The first activity, construction, will be of short-term duration, but the effects will be more lasting. Areas that are disturbed, especially in areas where artificial revegetation is impractical and natural revegetation is very slow, will be subject to wind erosion.

Vehicle travel will be a long-term effect although more concentrated during the construction phase. Development of new access roads and improvement of existing roads will encourage vehicle travel in the area long after completion of the power line.

Wind erosion of disturbed areas is already occurring, to some extent, but will be further aggravated by construction activities.

Dust production, in addition to being physically and visually unpleasant, coats the surrounding vegetation resulting both in reduced palatability and reduced vigor (USDI, BLM, 1975).

(c) Corona Effluents

High voltage transmission lines are known to create ozone and nitrogen oxides in the vicinity of the conductor (Final Environmental Impact Statement, Tucson Gas and Electric Transmission Line Corridor, 1975). The amount of discharge is considered insignificant for a 500 kilovolt line (E. Willard, Bonneville Power Administration, private communication, 1975)1/. Since the capacity of the proposed line is approximately half that of a 500 kilovolt line, the gaseous effluent produced is also expected to be insignificant (Final EIS, Tucson Gas and Electric).

(3) Land

(a) Topography and Physical Setting

No impacts are expected.

(b) Geology

No impacts are expected.

(c) Soils

Soil depth will be affected adversely on all new roads because of surface disturbance. A, B, C and E soils (see map II-2 for locations) are partially protected by a platy surface

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1/ Review Memo for the Malin, Oregon to Midpoint, Idaho Draft 500 KV EIS, 6/17/75.

structure, and when this is disturbed, wind and water erosion will remove the top soil. Group D soils are unstable and consequently will be highly impacted by surface disturbance. Water erosion will cause a reduction in soil depth on soils in Group E, if rehabilitation is not applied soon after disturbance.

Soil nutrient properties will be only slightly impaired from subsequent soil erosion. Soil pollution will occur only if human wastes, such as crankcase oil, are dumped on the soil surface during construction and maintenance of the line.

All soils will be damaged by surface interference with the native vegetation. These are soil interrelationships that have been developing simultaneously for thousands of years. For the proposed route, a minimum of 216 acres will be permanently altered by the surface soil disturbance if helicopters are not used during construction, and 182 acres if helicopters are used. This disturbance will open the surface soil up for accelerated erosion from wind and infrequent summer thunderstorms. Because all life in this environment is geared to such a slow progressive pace, several decades are required to heal the scars of soil alteration and restore climax vegetation.

Careless maintenance, resulting in lubricant spills, will alter the soils capability to support vegetation for several years.

Access roads to the proposed tower sites; access trails between the towers, and tower site construction will constitute the main soil disturbance. Some coarse-textured soils in Groups A, B, and C may pose some problems to construction because of instability of both surface and subsurface sand. Road building and clearing on steep slopes increases disturbed area and has an associated higher erosion

potential.

(d) Land Use

Due to the linear aspect of a transmission line system, the lines have the potential of impacting many different land uses. However, two principal land uses along the proposed route have been identified: agriculture (livestock), and recreation. Since these two uses are extensive throughout the study area and not intensive in a particular area, impacts of the proposed power line are expected to be minimal. (See Table III-3 and Table III-4 later in this chapter).

In addition, due to the existence of the Southwest Gas Pipeline which would parallel the proposed power line for approximately 50 miles or 56 per cent of the total length, any new impacts of the proposed power line are expected to be negligible.

The proposed transmission alignment will avoid all known active mining districts and all large historical mining sites such as abandoned mines and ghost towns. It can be expected at some time within the next fifty to seventy-five years, however, that a conflict between the proposed transmission line and a potential metallic or non-metallic mining activity could develop.

A conflict could also be created by the operational restriction placed on a potential mining activity by the transmission line. For example, a tower located in a proposed open pit mine could potentially remove several acres of land and an unknown quantity of material from production. If the mineral values are significant, the line may require relocation to allow mineral extraction. Other restrictive aspects of a transmission line being located in an open pit surface mining activity

include the problems created by blasting in and about the conductors and towers and by limiting the use of large earth moving excavation equipment in the vicinity of the towers.

Conflicts with an underground mining operation would not be as complex and as far reaching as with the open pit operation because shafts, tunnels, and tailings can be located to avoid a direct conflict with the transmission line, without actually restricting the operation of the mine.

(4) Water

No primary impacts on the water resources are expected to result from the proposed action. Surface disturbance of approximately 216 acres will have a minor effect on the hydrologic cycle by increasing the surface runoff and reducing infiltration.

Some secondary impacts on water quality and quantity may result from use of expanded electrical service once the power line is energized. The increased power supply from the Oreana substation may allow irrigation of additional lands, thus reducing water table levels and some lands presently flood irrigated may be sprinkler irrigated in the future. Any sprinkler irrigation would reduce runoff flows, thereby reducing the amount of salts discharging into the Humboldt Sink.

An increased power supply may also enhance mining activity; however, electrical energy is not a limiting factor.

b. Living Components

(1) Vegetation

The power line corridor passes through two main vegetation types, salt desert shrub and northern desert shrub. Table III-1 compares the minimum expected surface disturbance, in acres, for the proposed action and alternatives. These surface disturbance figures reflect those areas where vegetation will be severely damaged if not totally destroyed.

About half of the anticipated disturbance will be due to the 14 foot wide line access road, 10 foot wide vehicle trail along the line and necessary spur roads, with the remainder due to foundations, footings, staging areas, etc. Further disturbance of a lesser magnitude can also be expected to occur in the power line corridor.

Despite the acreages outlined on the chart, the overall impact on vegetation is not expected to be great, because most of the corridor area passes through sparsely vegetated lands of fairly low productivity.

The substation site (about 3-2/3 acres) near the Tracy power plant will be completely cleared of vegetation. However, such a small area is involved that the impact of vegetation removal is small compared to the disturbance which will result from the entire project.

Any disturbance of vegetation in the study area can be considered long-term. Mainly due to the lack of precipitation, any revegetation, especially in the salt desert shrub vegetative type, is extremely difficult. Because of this, any revegation efforts would be ineffective in the majority of the corridor area. Revegetation in

TABLE III-1

Impacts of Proposed Action and Alternatives on Vegetation

	Salt Desert Shrub		Northern Desert Shrub		Other	
	Miles	Acres Disturbed*	Miles	Acres Disturbed*	Miles	Acres Disturbed*
Proposed Action (90 mi.)	77	166.83 137.74	13	49.17 44.26	--	--
Alternative #1 (93 mi.)	85	169.09 149.89	--	--	8 (crop-land)	15.91 14.11
Alternative #2 (99.5 mi.)	83	166	11	43	5.5 (barren)	--

*First entry indicates minimum disturbance without use of helicopter.
Second entry indicates minimum disturbance with use of helicopter.

the northern desert shrub vegetative type is somewhat easier, although subject to limitation.

An invasion of pest species such as halogeton is likely to take place on disturbed areas. Halogeton, a frequent invader, is poisonous to livestock. The route of the natural gas pipeline, passing through much of the power line corridor area, is an example of the invasion of halogeton on disturbed soils and the lack of natural regeneration of native species. The gas line was constructed more than 13 years ago and is still highly visible. Contributing to the lack of revegetation along the pipeline right-of-way is the continued vehicular traffic along the route. Similar impacts can be expected to result from any travelled ways developed in connection with the power line project.

(2) Animal Life

The different phases of construction will have varied impacts on wildlife. Impacts on aquatic animal life and habitat may temporarily occur at the two stream crossings on the Truckee River and at the stream crossing on the Humboldt River if vegetative bank cover is destroyed and siltation is increased. The magnitude of the impacts will depend on the degree of disturbance created at these sites; however, this should not be a significant long-term effect. Construction activity within or near aquatic environments will disturb waterfowl, especially during nesting periods. Activities during construction will cause some temporary displacement of wild horses ranging in the southeast portions of the Pah Rah and the Trinity Ranges.

Soil disturbance and removal of existing vegetation along access roads and at construction sites (182-216 acres) will have impact on reptiles, song birds, upland game birds, and small mammals depending on the vegetation for food and cover. The impact will be greatest on those species having a small, restrictive home range. The impact on species having a large, less restrictive home range, such as coyotes, mule deer, hawks, etc., will be minimal.

Noise and human disturbance during construction could displace certain birds and animals in the vicinity. For example, raptors may leave the area or temporarily abandon nesting sites (eyries) and sage grouse could abandon historic use areas. Following construction, the noise level associated with the 230 kilovolt line, though slightly louder than the proposed 345 kilovolt, will be only noticeable at the power line location and will not be significant.

The Truckee Range, proposed for reintroduction of bighorn sheep, will be impacted by an increased 3 miles of roads and a higher possible incidence of long-term human disturbance. This may reduce the size of the bighorn sheep habitat by 3 square miles from near the Washoe/Churchill Co. line southwest to Little Valley.

The secondary impact resulting from increased power supply for the Lovelock District can lead to more intensive farming and/or increased use of available land for farming through sprinkler irrigation. This may reduce the amount of waste water flows to the Humboldt Sink.

The type of vegetation and the species of waterfowl, shorebirds, and marsh birds utilizing these areas are influenced significantly by the amount and quality of the return flows.

(3) Ecological Interrelationships

Areas disturbed in the process of constructing the power line will be set back to the early stages in ecological community development. Also, these systems will have less total energy exchanges due to the reduction in the food chain. Fortunately, the significance of this ecosystem regression is limited to the immediate vicinity of the construction areas and will have only a limited minor affect upon the surrounding communities of the regional ecosystems.

(4) Human Values

(a) Visual Resource

The effect upon the visual resource of the proposed route and alternatives is the most important and significant impact relative to this evaluation. In general, transmission lines, associated roads, vegetation manipulation, and other related construction activities that result in surface disturbance and alteration of the existing topography, do not relate to the natural landscape character and are readily apparent.

The Bureau's visual resource inventory and evaluation system which has been discussed in Chapter II, and appears as an analysis of the subject area in Appendix 6-A, provides for the identification of different degrees of visual impact. Those identified in the subject area and delineated on Map II-9 are:

Class II	Highly significant
Class III	Moderately significant
Class IV	Significant

The following chart shows in summary form the impact of the proposed line and each alternative within these classes.

Table III-2

IMPACTS OF PROPOSED ACTION AND ALTERNATIVES ON THE VISUAL RESOURCE

	CLASS II HIGHLY SIGNIFICANT	CLASS III MODERATELY SIGNIFICANT	CLASS IV SIGNIFICANT
PROPOSED ACTION (89.4 miles)	10.9	0	78.5
ALTERNATIVE # 1 (93 miles)	16.5	2	74.5
ALTERNATIVE # 2 (99.5 miles)	10	14.50	75

* Class II - Highly Significant

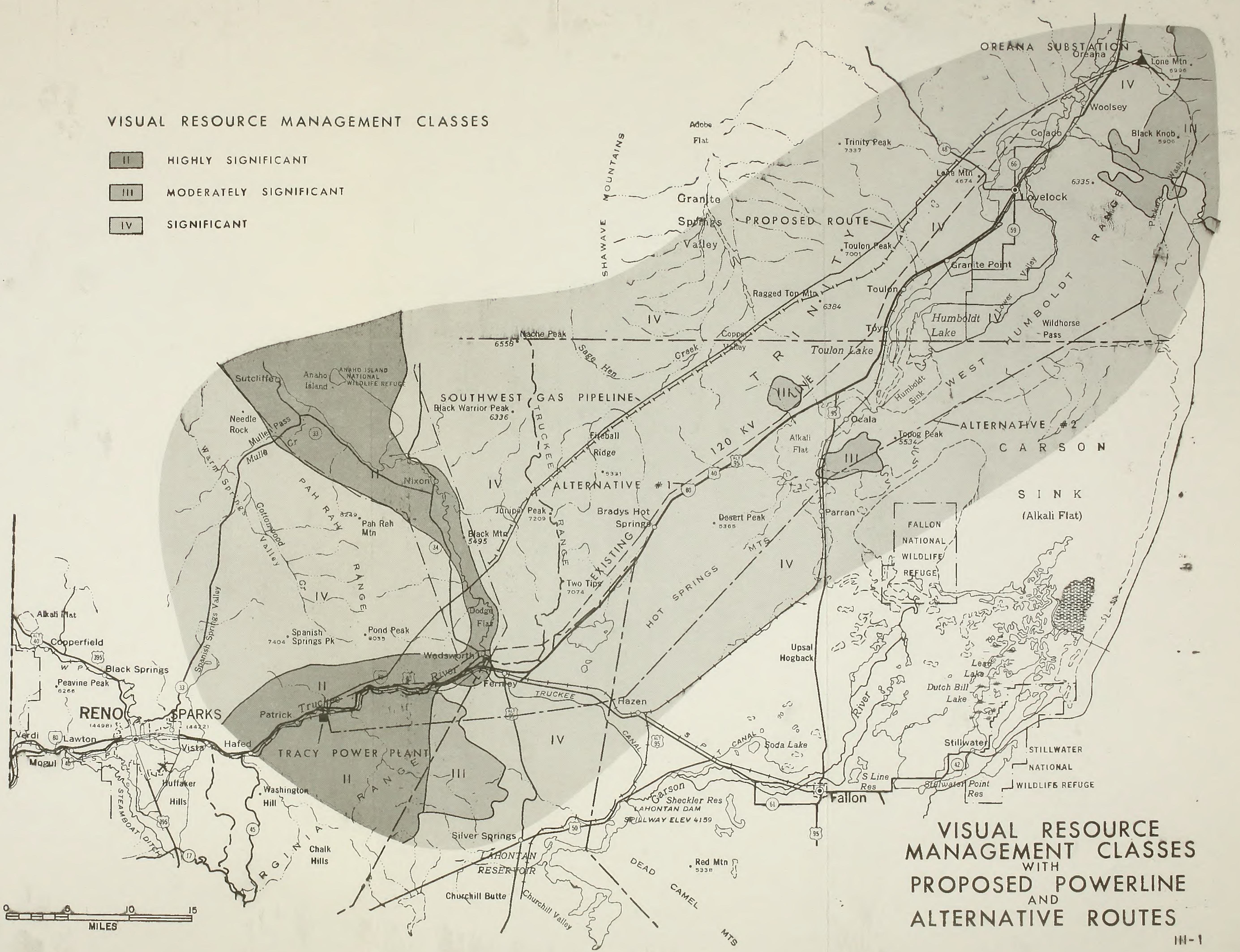
This category, because of its high sensitivity level and "A" scenery classification, does not lend itself well to transmission line placement. This is especially the case when Class II is viewed in the far foreground/middleground and background zones where line clearings, roads and structures may be very noticeable.

*Class III - Moderately Significant

More opportunity exists for transmission line location in this class than in II because of the lower B and C scenery class rating. However, because of the high sensitivity level, the probability for visual impacts is great when crossing Class III areas.

* Class IV - Significant

Transmission lines and related activities in Class IV areas can cause negative visual impacts but their importance would be less than in Classes II or III. Transmission line developments could be compatible in this class, particularly in the far foreground/middleground and background zones where distance will reduce potential problems such as reflection and silhouetting.



VISUAL RESOURCE MANAGEMENT CLASSES WITH PROPOSED POWERLINE AND ALTERNATIVE ROUTES

Impacts Common to Proposed and Alternative Routes

Overhead transmission lines, towers, roads, and associated construction activities will have a noticeable impact on the proposed route and alternatives. Shiny aluminum tower structures ranging in height from 60 to 120 feet will contrast with the much lower vegetation forms prevalent over much of the subject area. A transmission line and accompanying road will appear as a straight line for several miles, traversing the landscape and contrasting with natural color and vegetative types. Surface disturbance can be expected to be high, particularly at tower site locations where heavy equipment and concentrated use will damage vegetation and soils, producing noticeable visual impacts.

Proposed Route

The proposed route leaves the Tracy Generating Station, immediately crossing heavily used Interstate 80 and traversing 8 miles of a Class II - highly significant visual resource area. Anticipated impacts will be from reflection of the aluminum structures, and the possibility of silhouetting structures and conductor in skyline situations. Additional impacts will include road cut banks and tower construction sites on the steeper slopes. The line then enters a Class IV - significant visual area in which the proposed line crosses State Highway 34. Impacts at this crossing can be expected to be critical in terms of reflection and vegetation removal. The proposed line then re-enters a Class II area where it crosses the Truckee River at Dodge Flat. Similar impacts as mentioned in the first Class II area are expected here. Upon leaving the river, the route enters into a Class IV - significant visual resource area for

the remaining 78.5 miles. Along this section, it generally parallels Interstate 80 but remains in the background visual zone except for the Interstate crossing at Oreana. It also crosses State Highway 48 (moderate use) at a point approximately 6 miles northwest of Lovelock. Impacts through these remaining areas can be expected to be minimal, especially where the line would remain in the background visual zone. The two road crossings at Highway 48 and Interstate 80 can be expected to have impacts similar to other road crossings mentioned.

(b) Outdoor Recreation

The overhead intrusion of an extra high voltage power line is an encroachment on a landscape with unlimited vistas otherwise virtually unaffected by the sights, smells and sounds of civilization.

All recreational experiences are affected by this additional intrusion; however, for the most part the impacts will be visual.

Additional roads caused by power line failure construction most generally will detract from sightseeing opportunities as access roads are numerous.

Major impacts to recreation will result when the power line is within view of established recreation use areas and travel routes. Specific pole locations will affect the degree of this impact.

(c) Social Cultural Values

Educational/Scientific

The natural flow of the horizontal lake terrace lines may be impacted as possible tower site location interrupt individual terrace rows. They may occur at any corridor location within the area.

No known National Historic Register Sites are to be impacted by any of the corridor routes.

The archeological values along the proposed line have been surveyed and field cleared for construction between the right-of-way boundary.

The presence of transmission lines close to archaeological sites would reduce their value for interpretation and access improvement would increase the potential of vandalism of any site found in the general area of the corridor. Furthermore, indirect cultural impacts may result as construction crew members collect cultural material outside the corridor boundaries.

Impacts resulting from power lines crossing historic trails are of a visual and mood nature. One will no longer experience the sights and wilderness feeling as experienced by early explorers.

(5) Socio-Economic Values

An economic profile of current activity in the impact area and associated counties has been presented. Against that base, this section will attempt to indicate the possible impacts resulting from construction of Sierra Pacific's 230/345 kilovolt transmission line. The socio-economic impacts of the proposed route and Alternative 1 are essentially the same; therefore, will be considered together.

(a) Population

Implementation of the proposed action will have negligible impact on the population base within the study area except indirectly by providing additional electrical power to the Lovelock electrical district and subsequently, the expanding Reno-Sparks urban complex, provided the future connection system with Idaho is approved and completed.

(b) Employment and Income

Since construction of the proposed power line will employ a small crew (30-60 persons) of highly skilled men for a relatively short period of time, direct economic impacts to both the employment and income sectors within the study area will be minimal. This is especially true of the Reno area where a highly diversified labor pool exists. The smaller communities near the route of the proposed power line and alternatives will also be impacted very little due to high mobility of construction activities and the fact that labor pools in these small communities will not be affected. This is due primarily to the method of "Bid Construction" -- where a successful contractor obtains his labor from specialized labor markets not usually found in small rural communities.

(c) Standard of Living

The rural counties impacted by the proposed power line (such as Pershing and Churchill Counties) experience a high level of transfer payments, and economic activities are primarily related to agriculture/mining interests. Within this environment, the construction of an electrical transmission line

will have the following impacts: (1) Minimal employment (see section b above); and (2) expansion of the traditional income/employment base by enhancing the possibilities of both agriculture (provision of electrical energy to further intensify that sector), and mining (electrical energy to make possible the expansion of the mining industry). The proposed power line, through its end product - increased energy supplies, will provide greater opportunities for both employment and income generation and thus increase the social well-being of those counties involved.

(d) Housing

Due to the highly mobile nature of power transmission line construction, and the low labor requirement, the impact on housing will be negligible in the communities along the proposed route.

(e) Taxes

Property taxes on power lines will be the primary tax benefit to the governments through whose jurisdiction the power line passes. (See Table I-1). Tax assessments are set by low at a certain percentage of cash value. This is 35 per cent in Nevada. The county tax rate is then applied to that percentage of the value.

In the five-county area, this potential tax benefit can be estimated as shown on Table III-2. This table indicates the impact will vary from county to county; in all counties, the addition to the tax base will be beneficial. Counties with a high ratio of new tax revenues to population will be most affected. In this regard, Pershing and Churchill (alternative routes) Counties will benefit the most. However, the proposed route offers Pershing County the best comparable advantage or opportunity to either reduce tax rates or make use of increased revenues for schools, highways, or other public facilities.

TABLE III-3

Estimated 1975-6 Added Increase in Property Tax Revenue (Dollars) by County and Comparable Routes

Proposed Route

County	Line Miles	Increased Assessed Valuation ($)	Percent of Total County Assessed Valuation	Added Increase in Property Tax Revenues ($)
Washoe	25	634,000	*	24,000
Churchill	20	509,000	*	20,360
Pershing	45	1,135,395	4.00	37,240
Total	90	2,278,395	.20	81,600

* Less than .001

Alternative Route (South)

County	Line Miles	Increased Assessed Valuation ($)	Percent of Total County Assessed Valuation	Added Increase in Property Tax Revenues ($)
Storey	12	300,000	3.80	12,450
Lyon	12	300,000	.40	11,790
Churchill	50	1,272,500	2.70	50,900
Pershing	26	656,006	2.20	21,516
Total	100	2,528,506	1.60	96,656

(6) Local Regulatory Structure

(a) Local Land Use Plans

Responsible local plans are in effect at the county level which can provide adequate control authority leading to full compliance with local Master Plans. At the present time, Pershing and Storey Counties are in the process of evolving such a plan.

(b) Federal Agency Plans

i. Bureau of Land Management

The lands involved with the proposed power line have been classified for retention by the Federal Government under the Multiple-Use Act of 1964. Based on this classification both Carson City and Winnemucca BLM Districts have developed land use plans for these areas. These Management Framework plans indicate the best routing of future rights-of-way through the Pyramid, Fort Churchill, Blue Wing and Sonoma Planning Units. These plans basically recommend that these rights-of-way should follow current utility corridors. The primary rationale behind these planning decisions is that future rights-of-way follow existing disturbed areas. Sierra Pacific's proposed route partially conforms to this basic rationale, while Alternative 1 conforms fully to a utility corridor.

ii. Bureau of Indian Affairs

See description under "Existing Environment".

Since Bureau of Reclamation plans for development of the "Dodge Flat" area, which is located on the Pyramid Lake Indian Reservation, are in preliminary stages, it is not expected that current right-of-way plans of the applicant will materially affect those (Indian) plans. (See Table III-3, "Power Line ROW Available for Multiple-Use").

Exact location of a proposed HUD housing development is not known; however, visual impact could be significant if site selection is near (within 2 miles) the proposed or Alternative 1 route.

(7) Attitudes and Expectations

Attitudes of the local populace toward the construction of a power transmission line have been neutral which can indicate either apathy or acceptance of the proposed power line. Since the increased availability of reliable electrical energy can provide the stimulus for economic development, the impacts of the proposed action can best be described as beneficial.

On the other hand, the availability of a reliable power supply could preclude efficient use of other energy sources, which may involve greater environmental impacts.

The proposed section of the line crossing the Pyramid Indian Reservation has the potential of impacting future land uses.

TABLE III-4

POWER LINE ROW AVAILABLE FOR MULTIPLE USE

kV	SYSTEM TYPE (CIRCUITS)	MATERIAL	CONFIGURATION	ROW WIDTH (Feet)[1]	TOTAL ROW AREA (ACRES/MILE)	TOTAL TOWER AREA (sq.ft.)	ROW AREA AVAILABLE FOR OTHER USE (%)
115	Single or Double	Wood	H-frame (unguyed)	50-90	6-13	275	over 99
115	Single or Double	Wood	H-frame (guyed)	90	13	675	99
115	Single or Double	Wood	Single pole	50-90	6-13	100	99
115	Single or Double	Wood	Single pole (guyed)	90	13	300	99
230	Double	Metal	Tubular Pole	125	14-15	100	over 99
230	Single	Metal	Flat or delta	125	14-15	400	over 99
230	Double	Metal	Stack	125	14	1000	98
500	Single	Metal	Delta	125-160	15-19	900	99
500	Single	Metal	Flat	125-160	15-19	700	99
500	Double	Metal	Delta	125-160	15-19	1200	98
500	Double	Metal	Stack	125-160	15-19	1700	98
765	Single	Metal	Portal	180-220	21-26	3200	89-91

[1] See Section

Sources: Bonneville Power Administration: Environmental Statement, Fiscal Year 1975 Proposed Program, Facility Evaluation Appendix; Supplements to the Environmental Statement Fiscal Year 1976 Proposed Program: Lower Snake Grid Reinforcement, Pebble Springs - Marion 500-kV Line, Shelton-Kitsap 230-kV Line; General Construction and Maintenance Program; Working Document of Transmission Line Construction Characteristics.

It is important to emphasize that the widths given here are in no sense prescriptive. It is recognized that the widths for particular voltages may vary in different areas of the country as well as design features, and special conditions that may exist for a particular line. The figures in this table are intended to be representative only, and are provided for the purpose of illustrating rhe point that the greatest portion of a power line ROW is actually left free, as open space or for the possibility of other compatible uses.

(8) Hazards

When in place, the power lines will pose an "impact" hazard (flying into the power line), to raptors and waterfowl in specific areas. Raptors may use the towers for perches and have been known to nest on the tower structures. Because of the wide separation of the phase lines, there is little probability of electrocution of raptors.

The power line will be a hazard to low flying aircraft, especially where it crosses the Truckee River at two locations and the Humboldt River near Oreana. It could also pose a hazard to crop dusting in the Truckee River and Lovelock agricultural areas.

Federal Aviation Administration (FAA) Advisory Circular 70/7460-2D describes criteria for power lines which constitute an obstacle to aircraft. Criteria include maximum height above ground level or water level and a height-distance relationship in the vicinity of airports and heliports which are considered as a hazard to aircraft.

The transmission line poses little threat to human safety from electrocution.

The minimum line clearances (32 feet above ground for the conductors), minimum separation (14 feet between conductors) and minimum separation (9 feet between conductor and ground) required by the National Electric Safety Code assures the relative safety of the facility. Should a ground-fault (electrical circuit becomes grounded) occur, automatic circuit breakers at the substation will close and lock, thereby cutting power to the grounded line until the fault is cleared.

Data from Southwest Gas Co. indicate that induced voltage to the gas line would be hazardous to human and animal health if the power line right-of-way were allowed to immediately parallel the Southwest Gas Co. pipeline for 50 miles.

Noise level associated with the operating line will be audible at the power line right-of way and the substation location. Beyond these areas noise will not be audible.

2. Possible Mitigating or Enhancing Measures

a. Non-Living Components

(1) Air Quality

(a) Vehicle Emissions

Because of the minor impact of vehicle emissions, no mitigating measures are required.

(b) Particulate Matter

To mitigate the impacts of particulate matter, surface disturbance should be held to a minimum. This would mean destroying as little vegetation as possible; and use of helicopter for construction in rough terrain. A BLM inspection officer should be appointed to "watchdog" the construction project from the earliest stages and consider mitigating measures for access and site needs to meet the requirements of the site. Also, the inspector must consider each access request both within and outside of the right-of-way. Access roads must be restricted to one dozer blade width and tower pads to only the size required for turn-around.

To discourage use of the roads by members of the public, roads should be scarified and the land returned as close to the original condition as possible. Maintenance inspection can be carried out by helicopter. Water sprinkling trucks should be used during construction to keep dust generation at a minimum.

(c) Corona Effluents

Since the impacts of the proposed action would be insignificant, no mitigating measures are required.

(2) Land

(a) Soils

If the proposed route is allowed, the contractor should be required to use the paralleling natural gas pipeline road except where the authorized BLM Officer determines other access is needed and flags same with the power line contractor. Access roads will be constructed with adequate water barring and drainage if they are to remain in use; otherwise, they will be rehabilitated to prevent accelerated erosion.

Attempts at revegetation for soil protection on these disturbed soils by seeding will probably not succeed because of the dry environment; hungry livestock would eat the seedlings, if they emerged. Minimizing surface disturbance and require erosion control measures appear to be the most effective mitigating measures possible. Endemic weeds, including halogeton and pepperweed usually invade disturbed areas within three years time, and will help to inhibit wind erosion. This occurs primarily on soil groups C and E.

If fuel or lubricants are spilled, these should be cleaned up to minimize the impact on the soil's ability to support vegetation.

(b) Land Use

i. Agriculture

Cultivated meadowland and hay land on the Truckee River and potential agriculture land on Dodge Flat should be avoided where possible. When cultivated or potential agriculture land is crossed, the largest reasonable distances between towers

must be used and the right-of-way corridors must be located along fences, ditches, roads or meadowland perimeters in order to avoid conflicting with any agricultural production. The cross-braced "H" Frame Tower must be used because basal area requirement is minimal. These measures would ensure that a minimum area of productive land will be used for tower sites and that a minimum of inconvenience or conflict will be caused.

ii. Mining

The proposed transmission line alignment will avoid all known active mining districts and all large historical mining sites such as abandoned mines and ghost towns.

Where the present located claims must be crossed, the impacts can be reduced by selectively locating specific structures so that a mining activity can be conducted in and around the towers and under the corridors with a minimum of restriction and inconvenience. Route line to avoid close proximity to established extraction and supporting operations, including hauling and delivery of supplies.

iii. Transportation

The proposed and alternative transmission lines each involve a minimum number of river, stream, highway, railway line and other similar crossings. Lines placed in high visibility areas such as road crossings and in areas where people concentrate, can be mitigated by utilizing terrain advantages, crossing at or near right angles or tower designs appropriate to the situation where natural topographic advantages for screening are not available.

(3) Water

Secondary impacts (such as increased water usage for irrigation) on water resources are a result of power availability rather than power line construction activities. No mitigating measures can be applied to alleviate these impacts.

b. Living Components

(1) Vegetation

Revegetation is impractical over most of the study area; therefore, efforts should be made to minimize vegetative disturbances. In order to facilitate natural revegetation, any topsoil should be stockpiled near each disturbance site before construction begins. Following construction, compacted areas should be scarified and the topsoil replaced over disturbed areas.

(2) Animal Life

Operators must be advised of Federal and State laws concerning raptors and wild horses. Construction activities in critical raptor habitat should be restricted during the crucial nesting periods. Raptor nesting habitat is located in the vicinity of Trinity Peak, Lone Mountain and west of the Pyramid Indian Reservation. Construction should not occur in these areas from March through June.

Disturbance to the bank and stream bed at crossing sites on the Truckee and Humboldt Rivers should be minimal and approach construction must be conducted to avoid placing soil and spoil in the stream. At clean-up stage, the earth must be placed in the approach cuts,

dressed and seeded to restore the stream bank. Seeding time and seed mixture shall be determined by the Authorized Officer.

Off-road vehicle travel and new road construction should occur only where absolutely necessary to minimize destruction of existing plant cover which provides food and cover for wildlife.

Construction activities in the vicinity of waterfowl nesting areas should be restricted during the months of April through June. These are located along the Truckee and Humboldt River crossings.

(3) Ecological Interrelationships

Mitigation of impacts is addressed in both the living and non-living environment sections.

(4) Human Interest Values

(a) Visual Resource

The following are possible mitigating or enhancing measures for the listed potential impacts:

* Highly Reflective Towers in Critical Visual Situations:

- Treat aluminum towers with dulling agent
- Take advantage of vegetative and land form screening
- Consider wood structures in lieu of aluminum in key areas

* Tower Height Contrast with Land Forms and Native Vegetation

- Locate structures in background or seldom seen areas
- Consider alternate structure design in critical areas; i.e.: "Slingshot", modified wood structures.

* Long View of Straight Alignments:

  - Locate line parallel to natural contours and in conformance with the topographic features
  - Construct line at base of land form changes rather than center of valley bottoms.
  - Cross major transportation routes as near perpendicular as possible to allow for maximum setback of structures and minimum visibility from roadway into the right-of-way on each side.

* Surface Disturbance Resulting from Construction and Activities in Critical Visual Areas:

  - Retention of native plant materials
  - Select construction sites (towers and roads) in areas conducive to revegetation
  - Rehabilitate (land form and vegetation) construction scars so as to restore natural character.

* Silhouetting of Transmission Line against the Sky

  - Avoid crossing hills at right angles to the contours, especially where the right-of-way is centered on a hillcrest and results in a symmetry that draws attention
  - Make crossings of hills and mountains at oblique angles
  - Place towers below crests or horizon lines in key observer positions.

(b) Outdoor Recreation

Recreational sightseeing is the major opportunity expected to be impacted as a result of the applied activity. Therefore, those possible mitigating or enhancing measures discussed under Visual Resources would apply here.

(c) Preservation of Archaeological Values

A series of sites subject to direct and/or significant indirect impact can be essentially preserved by the strategic placement of construction along the right-of-way to avoid inventoried archaeological and historical sites. See Appendix 6B and D and Map II-11.

The strategic selection of alternate access roads may be needed to avoid certain sites crossed by possible access roads. These sites are (1) the Ragged Top Tungsten Mine and associated habitation ruins (26PE-342), and (2) the petrified wood locality (26Pe-0014P).

Uncharted Indian burial sites on Dodge Flat must be protected. This can be accomplished by field location of access roads and tower locations cooperatively agreed upon by the Tribal Council and the Company.

The final published cultural report required by Federal law must be prepared at the applicant's expense and submitted to the Authorized Officer prior to beginning construction. Any changes in proposed

alignment or selection of an alternative route will require a field archaeological clearance by a professional acceptable to the Authorized Officer.

(5) Hazards to Human and Animal Health

Phase lines crossing the Truckee and Humboldt Rivers should be properly marked so they can be avoided by aircraft. This should be done even though the line may not be 200 feet above ground. FAA criteria listed in AC70/7460-2F covering maximum height above ground level and water level (200 feet) should be met.

The facility will present no electrical shock hazards during operation provided designed safety features for the transmission line and substations are incorporated and maintained properly.

The right-of-way for the power line should be separated from the Southwest Gas line by at least 1,000 feet and preferably 1,320 feet to minimize the inducted voltage to the gas line and thereby reduce the hazard to humans and animal life.

Grounding of the gas line may be required by connecting the gas line to the electric transmission tower grounding system with heavy cable and capacitive elements which will allow flow of A.C. current, but not D.C. current used for cathodic protection.

3. Recommendations for Mitigation or Enhancement

a. General Measures

Surface disturbance must be held to a minimum to prevent long term surface damage along the route because most of the area has very limited rehabilitation opportunities.

To achieve this objective the construction must be consistent with guidelines in the U.S.D.A. & U.S.D.I. publication, "Environmental Criteria for Electric Transmission Systems" and the mitigating measures for the particular right-of-way as follows:

(1) Roads, Trails and Tower Sites

(a) The Authorized Officer (District Manager, BLM; Environmental Coordinator, BIA) must appoint an individual to monitor the construction on the agency's management area. The inspector must have the authority to consider requests for access, tower site spurs and equipment pad construction, and any access improvement along the right-of-way between towers. Such requests must be considered in accordance with right-of-way or special land use permit terms, conditions and special stipulations to assure that no surface blading will occur unless necessary and required by the permittee for construction of the power line in a safe and timely manner.

(b) Prior to construction the applicant and contractor must contact the District Manager and responsible BIA official for a pre-construction conference to arrive at a mutual understanding of the job, surface protection, inspection liaison, and permit requirements.

The proposed line must be traveled, especially within the mountainous sections, to consider access requirements and tower site location in relation to environmental quality.

(c) The right-of-way has been proposed to utilize nearby established access roads; therefore, existing roads must be used as much as possible for access. Off-road vehicle travel must be controlled to one route for access to towers and along the line where ground conditions permit.

(d) Primary access road construction, when required, will be constructed with water bars and drainage facilities.

(e) Access spurs and trails must not exceed one dozer blade width or 14 feet. Tower site equipment pads must not exceed the size required for equipment turn-a-round and safe operation. Site preparation at storage yards and substations must be restricted to required area.

(f) Dust abatement practice of watering will be required at storage yards and on heavily traveled dirt roads leading to storage yards within one mile of towns or occupied residences.

(g) Soil removed from tower sites will be stockpiled for subsequent site smoothing and rehabilitation.

(h) Bladed roads, trails, storage areas, access spurs and tower pads no longer required for line operation and normal maintenance must be cleaned up; scarified; spoil piles smoothed; water bars installed; and tower sites restored to natural contour. Where site environment permits, seeding using a mixture specified by the authorized officer must be accomplished to ensure complete surface rehabilitation.

(i) Roads, trails and other sites required for normal operation and maintenance must be cleaned of debris; spoil piles smoothed; and erosion protection facilities such as water bars and drain ditches installed. Where site environment permits and conflict with facility operation will not occur, seeding using a specified mixture must be accomplished for surface protection.

(j) All waste must be removed and disposed of in a manner consistent with State and Federal Sanitation laws. Fuel and lubricant spills must be cleaned up in a timely manner.

(k) Where streams are crossed, earth and spoil from the approaches must not be deposited in the stream, but stock-piled for rehabilitation work upon completing the segment of line. The banks will be smoothed to natural contour and seeded using a species mixture required by the Authorized Officer.

(l) Construction and subsequent maintenance inspection must not occur during times when the surface is wet to avoid rutting and resulting erosion damage to roads and soil surface.

(m) Line maintenance inspection should be conducted from an aircraft whenever possible and appropriate. Routine inspection and maintenance must also include access roads and, where erosion damage is probable, previously rehabilitated sites.

(2) Land Use Conflicts

(a) The line should be located to reduce visual impacts by following natural ground features; avoiding routes perpendicular to slope; and utilizing natural topography to screen the line for much of the distance. The line should be checked by the Authorized Officer

and the applicant for undetected visual conflicts during the tower site location phase and any conflicts found mitigated through tower site relocation.

(b) A cultural clearance must be conducted prior to all surface manipulation activities in locations where such clearance has not been given. (Refer to "Archaeological Reconnaissance along Proposed Right-of-Way Tracy to Jackpot" by Mary Rusco).

(c) Any new alignment of the proposed route must be approved by the Authorized Officer and will require an archaeological clearance prior to any construction.

(d) Non-reflective towers must be used where the line crosses populated or heavily traveled areas.

(e) The final line location within the corridor must recognize and consider the requirements of additional power transmission rights-of-way which may be required to meet future energy demands of the area.

b. Specific Site Measures

(1) Preservation of Archaeological and Historical Values

(a) Power line access routes must remain at least 1/4 mile from the site as follows:

i - Ragged Top Tungsten Mine & Associated Habitation Ruins 26 PC 342 *

ii - petrified wood locality
26 Pe 0014P*

* refer to Appendix "A" of Report of Archaeological Reconnaissance Along Proposed 230 KV Transmission Line

Right-of-Way - Sierra Pacific Power Company, Part I Tracy to Valmy, Nevada," Nevada State Museum by Mary Rusco, et al.

(b) Uncharted Indian burial sites on Dodge Flat must be protected. Tower sites and access trails will be located with the assistance of a Tribal Council and B.I.A. representative. In this manner, secrecy of location can be maintained while protecting the locations from disturbance.

(2) Heavy Travel Corridors

(a) As a minimum recommendation, dull finished towers must be installed within two (2) miles of hard surfaced or paved roads listed as follows:

i - Interstate 80 at Oreana	T. 28 N., R. 32 E., Secs. 1 and 2
	T. 28 N., R. 33 E., Secs. 5 and 6
	T. 29 N., R. 33 E., Secs. 32 and 33
ii - Seven Troughs Road State Route 48	T. 27 N., R. 31 E., Secs. 5, 7, 8, 13 and 24
iii - State Highway 34	T. 21 N., R. 23 E., Secs. 13 and 23
	T. 21 N., R. 24 E., Secs. 5, 7, 8 and 18
iv - Interstate 80 at Tracy Generation Station	T. 20 N., R. 22 E., Secs. 21, 22 and 28

(b) Because the proposed route may become a transmission line corridor in the future, the authorized officer should consider

requiring structures capable of supporting a double circuit line for two miles on each side of the roads mentioned above with the exception of - ii - Seven Troughs Road.

(3) Wildlife

Golden eagle and prairie falcon nesting sites are in the vicinity of the line in the Pah Rah Range and Lone Mountain. Construction during the period of March 31 to June 30 must be restricted in the Pah Rah Range to avoid disturbance to these species. The line route affects habitat in the following areas:

Pah Rah Mountains - T. 20 N., R. 23 R., Secs. 3, 4, 5, 6, 7, 8, 9 and 18.

(4) Land Use Compatibility

(a) Potential Mining Areas

i - Line routing over mining claims must be accomplished in full compliance with applicable laws. The route and tower sites must be agreed upon by the applicant and the claimant to avoid future interference with the mining operation. For tower sites located on claim areas the cross braced "H" frame towers would present the least conflict.

ii - Known claim location markers are listed as follows:

T. 21 N., R. 23 E., sec. 23, SW1/4SW1/4,
sec. 34 NW1/4

T. 23 N., R. 26 E., sec. 6, NW1/4NE1/4

T. 24 N., R. 26 E., sec. 22, S1/2SE1/4

sec. 27, NW1/4NE1/4

sec. 31, S1/2SE1/4

sec. 32, All.

T. 24 N., R. 27 E., sec. 8, NE1/4NE1/4

T. 27 N., R. 31 E., sec. 7, S1/2NE1/4, N1/2SE1/4

(b) Potential Agricultural Areas

i - The cross braced "H" towers must be used when crossing present irrigated pasture or hay lands on the Truckee River. Likewise the same tower design must be used in crossing Dodge Flat on the Pyramid Indian Reservation.

ii - To avoid conflict with agricultural use the route must follow existing boundaries or roads and longer distance between towers must be considered.

(5) Hazard Reduction

(a) Marshalling yards must be located to minimize traffic hazards from supply and construction vehicles.

(b) At road crossings the applicant must secure appropriate state or county crossing permits and provide flagmen as required to warn motorists of hazardous construction activity.

(c) The phase line should be properly marked where they cross the Truckee and Humboldt Rivers in those areas of limited visibility to lessen the possibility of collision by low-flying aircraft (FAA requirements). FAA criteria listed in AC 70/7460-2D relating to maximum height of tower and phase lines above ground level and water level (200') shall be adhered to as the minimum standard. If the Authorized Officer considers the crossing hazardous he may require marking as required in the FAA criteria.

(d) Where the proposed route follows the Southwest Gas Corporation Pipeline, the right-of-way must be separated by a distance of 1,000 feet. Precautionary grounding of pipeline to transmission towers must be done to protect workmen and the pipeline facility.

(e) To avoid significant impacts with waterfowl movements and important raptor wintering areas, the transmission line should be located generally along the proposed route.

(6) Visual Resource

The visual management inventory and evaluation analysis as presented in Appendix 6 and discussed in Chapter II identifies three visual classes in the subject area: Class II Highly Significant, Class III Moderately Significant, and Class IV Significant.

The degrees of modification allowed in these classes can be used to determine to what extent the following recommendations for mitigation or enhancement may be applied, by utilizing the visual resource contrast rating (see Appendix 6).

* The Bureau's visual contrast rating system will be implemented during final line and structure locating activities. Every effort will be made to meet the contrast rating objectives of each visual class.

Proposed Route

Class II - Highly Significant

Impacts

*Reflection of towers and conductors along I-80 and Truckee River.

*Silhouetting of transmission line against the sky.

*Surface disturbance in forms of road cutbanks and tower construction sites on steeper slopes.

*Long views of straight tower alignment as observed from I-80.

Recommended Mitigation:

-All towers in Class II will be treated with dulling agent to reduce reflection.

-Take advantage of vegetative and land form screening.

-Retain native plant material and natural land forms where line can be viewed from Interstate 80 and Truckee River.

-Rehabilitate construction scars by contouring procedures in order to regain as much natural character as possible.

CLASS IV - Significant

Impacts:

* Tower height contrasts with land form and native vegetation.

* Silhouetting of transmission line in large open valleys.

* Long views of straight alignments in view at high elevation observation areas and transportation routes.

* Surface disturbance in mountainous terrain resulting from road and tower construction.

Recommendations:

-Locate structures in background or seldom seen areas as much as possible when paralleling Interstate 80.

-Cross Highway 34-A and I-80 as near perpendicular as possible to allow for maximum setback of line structures on each side of road.

-Construct line across Dodge Flat, the area north of Brady Hot Spring, Copper Valley and other unnamed valley bottoms at the base of land form change rather than valley center.

-Utilize the natural contours of the foothills and canyons associated with the Pah Rah, Truckee and Trinity Ranges to conform with natural topographic features.

4. Residual Impacts

a. Non-Living Components

(1) Air Quality

(a) Particulate Matter

Even with the use of water sprinkling equipment there will be a certain amount of dust generated during construction.

Once construction is completed, disturbed areas will be subject to wind erosion and any roads that remain will be traveled by occasional vehicles with their associated dust plumes.

(2) Land

(a) Soils

Wherever the soil surface is disturbed sufficiently to rupture the surface plates and allow erosion, several generations of time will be required for natural restoration. At the present time there are no shortcuts without irrigation and protection practices to partially rehabilitate these fragile ecologic entities.

(b) Land Use

The discontinued use of the small areas of land occupied by the transmission line substations, towers, trails and access roads will be a residual impact for the life of the facility. The significance is generally considered to be low.

(3) Water

The marshes of the Humboldt Sink may receive less

irrigation runoff due to sprinkler irrigation methods. Stream systems may receive additional mine waste water from increased mining activity. There may be a reduction in water table levels because of increased irrigation. These residual impacts are strictly secondary, resulting from the power line being energized and the additional power being utilized, not resulting from power line construction. These residual impacts are strictly secondary in that they do not occur as a direct result of the line construction activities but rather are a result of one possible use of the power that the line will make available. It is noted that these impacts could result even if the line were not built, in which case private sources could be used to provide irrigation power with the same impacts resulting.

b. Living Components

(1) Vegetation

Residual impacts will be essentially the same as those outlined in the section on anticipated impacts. Since artificial revegetation is impractical in the area, and natural revegetation is extremely slow, areas cleared of plant material will remain that way for many years. Plants that do establish naturally tend to be invader species such as halogeton or cheatgrass. Any abrupt change in vegetative type will be of a long term nature and will be visible for miles.

(2) Animals

Residual impacts will be the continuing disturbance of the natural environment created by the development in the corridor and subsequent periodic maintenance visits. These however, should not be significant. Permanent abandonment of historical raptor nesting sites would be locally significant.

(3) Human Interest Values

(a) Visual Resource

The presence of transmission towers, transmission lines and the "row" in general, along with certain necessary construction practices, will result in visual impacts that cannot completely be avoided nor mitigated. The long term impact is, therefore, an additional man-made intrusion placed on the natural landscape.

Surface disturbance would result from construction activities including access roads, preparation tower site construction, line construction and clearing operations in general. The impact of these facilities and activities on the visual resource, soils, vegetation and watershed cannot be completely eliminated.

(b) Historical and Archeological

The possibility of cultural damage to sites not identified cannot be totally mitigated.

(4) Socio-Economic Interests

The mitigating measures will resolve most conflicts, however, the long term impact will be the limitation within the corridor of land uses that involve extensive above ground developments e.g. housing, industrial, mining and to some extent agricultural methods. Future land use would require planning around the existing power line.

(5) Hazards to Human and Animal Health and Safety

The hazard of collision with phase conductors and towers will remain for bird species. An impact potential by low flying aircraft will continue to exist even though safety precautions are implemented.

5. Relationship between Short Term Uses of Man's Environment and the Maintenance of Long Term Productivity

a. Non-Living Components

(1) Land

(a) Soils

Short term use of the environment will include soil surface displacement from construction activities along the chosen route, which will alter the areas. After the power line is energized, the access roads will need to be maintained for line maintenance. This will allow the general public access into otherwise unused areas, and therefore, increasing the vehicle travel on fragile roads. Even though the access roads may be surfaced, the open space value will be decreased by the human intrusion. At this expense, energy will flow into the national system of human welfare and productivity.

(b) Land Use 5/

The high-voltage facilities proposed for construction have an expected average useful life of 50 years for transmission lines with metal or concrete supporting towers. Experience in past years has shown that transmission corridors are often upgraded to higher capacity in response to technological advancements and energy demands. This will result in long term commitments of land to transmission corridors. Also, as long as the

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5/ Data extracted from the Environmental Statement of General Construction and Maintenance Program, U.S. Department of the Interior, Bonneville Power Administration, August 19, 1974.

existing hydro and thermal generation plants and major load centers remain, the present corridors will likely continue to be the best available route of power transmission from generation source to the user.

If required, complete removal of transmission facilities, including the tower footings, would be possible to make the land available for other uses. Retirement of lines would permit substantial return of the area to its natural state (vegetative regrowth would take many years) which will terminate any adverse impact on land and its productivity directly created by the line and would also terminate the benefits to productivity resulting from the availability of power provided.

The existence of transmission facilities affects land use planning and certain patterns develop adjacent to these corridors, such as the location of transportation routes, residential or industrial areas, and agricultural planning. Although removal of the line would make the corridor available for a full range of uses, these modified land patterns may continue to influence the use of this land. For example, irrigation systems often develop adjacent to transmission corridors. It would probably be very costly to change a large scale irrigation system to include the land reclaimed from a transmission corridor if the line were removed.

The long-term impacts on the environment and productivity, including the increased productivity of other activities through the availability of electric energy, are directly dependent on continued

existence of the transmission facility itself. The productivity resulting from the use of the electricity provided by new facilities will be substantially the same over the life of the facility. Similarly, the adverse effects on productivity, which are primarily related to land use consideration, will last as long as the facility remains in place.

b. Living Components

(1) Vegetation

Destruction of vegetation will be a long-term effect of the power line project. As discussed elsewhere in this report, artificial revegetation is extremely difficult and natural revegetation is exceedingly slow. Plants which do establish themselves on disturbed areas in this vegetative type are frequently undesirable forms such as halogeton which is poisonous.

(2) Animals

Surface disturbance resulting in habitat destruction and periodic maintenance of the power line will have long term affects upon the corridor environments. Because rehabilitation opportunities and natural recovery are very limited, the power facility development and access roads represent a long term reduction in total productivity and use of the corridor. However, because the area of use is very small compared to adjacent land, this is considered to be insignificant.

(3) Human Interest Values

The short term use of any of the identified corridors would result in a long term loss of productivity in the physical sense. Transmission lines, once constructed, have seldom been abandoned and removed. There have not been any technological innovations which make existing lines obsolete, and often, as in this particular instance, existing lines used in conjunction with new lines help improve the reliability of the existing electrical system. If a new line is constructed over any of the identified routes, northwestern Nevada would be supplied by two transmission lines rather than a radial line (multiple on one set of towers). Therefore, if one line broke down, power would still flow into the area.

New roads for construction may be used by recreationists after the transmission line is constructed.

Also a certain amount of power will be used indirectly by recreation activities. By using power to pump water onto areas that receive limited water the opportunity of big game and upland game hunting may increase.

6. Irreversible and Irretrievable Commitments of Resources

a. Non-Living Components

(1) Land

(a) Soils

The actual minimum amount of land (therefore, soils) that will be altered and occupied by installations of the proposed route is 216 acres without helicopter and 182 acres with helicopter on the proposed route. Soil or water erosion losses will not be great on the steeper slopes if rehabilitation measures are followed, but wind erosion will be active until the endemic annual weeds cover the surface. This usually occurs within three years' time. Soil loss would be a significant irretrievable commitment of resource because in this dry climate probably 400 to 1000 years are required to develop 1 inch of soil.

(b) Land Use 1/

Although the land taken by towers and access roads could, if required, be returned to its natural state, this land must be considered irreversibly committed for the life of the facility. Because of the permanent nature of substations, the land occupied by these structures will be irretrievably committed for industrial use. Of more importance is the effect of these facilities on land use planning. Long term use of land for transmission corridors or substation sites will undoubtedly lead to

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1/ Data extracted from the Environmental Statement of General Construction and Maintenance Program, U.S. Department of the Interior, Bonneville Power Administration, August 19, 1974.

land development adjacent to these facilities which would not occur otherwise. Removal of the transmission facilities would not, in many cases, return the land to its most beneficial use. For example, the location of a substation outside of a major residential area could lead to the adjacent land being used for industrial purposes as opposed to residential purposes. This section would then be irreversibly committed to industrial use.

Location of a transmission line would affect the availability of that land for mineral extraction, particularly mining of a low-unit value mineral such as sand or gravel. In some cases, relocation of the line would be practical, however, in many cases this would be uneconomical.

Any archaeological sites disrupted accidentally during the construction phase would be irreversibly damaged and would lose a significant amount of their archaeological or historical value.

Certain types of agricultural activities depend on large areas of unobstructed access. Examples include wheel and circular irrigation and in areas where this type of activity is practiced, construction of electric facilities may require adjustments in crop layouts to make optimum use of the land, and small portions of land may be uneconomical to farm.

Construction of transmission facilities, including transmission corridors, access roads and substations will irreversibly change the ecological association on and immediately adjacent to the construction

site. These changes should be small along the proposed route.

(2) Other Commitments of Resources Associated with Power Line Construction

The steel, aluminum, copper and other materials used directly in construction of the facilities will be irretrievably committed to transmission uses. See Table III-4. Retired equipment is generally reclaimed for use in other transmission facilities.

b. Living Components

(1) Vegetation

Areas cleared of plant material will remain so for many years. Plants which do move in are invader species. The loss of the more valuable plant species for possibly hundreds of years may be regarded as an irreversible and irretrievable commitment of the vegetative resource.

(2) Animal and Ecological Interrelationships

The distribution of wildlife species will be altered. Disturbance will cause sensitive, restricted habitat species to leave the area. Species not common to the area or more tolerant of disturbance could move into the altered habitat. Fortunately, the degree of disturbance is not significant, nor are there any endangered species involved in the right-of-way area. A loss of livestock forage will occur. This is insignificant, amounting to approximately 15 to 20 animal unit months of forage over the 90 mile route.

Potential bighorn sheep habitat will be lost due to improved access and man-made influences. This involves the Truckee Mountain

TABLE III-5

Typical Steel and Aluminum Requirements
(Tangent Towers)

	Structure * Tons Per Mile	Conductor Tons Per Mile	
		Steel	Aluminum
115 kv Single Circuit	20	1.5	3
115 kv Double Circuit	40	2	4
230 kv Single Circuit	30	3	6
230 kv Double Circuit	50	4	19
500 kv Single Circuit	90	10	40
500 kv Double Circuit	180	20	80

Source: General Construction and Maintenance Program, U. S. Dept. of the Interior, Bonneville Power Administration, August 19, 1974.

* For Guyed Delta design or proposed by SPPC. The actual structure (tower, guys, footing and anchor) metals will not approach the weight shown here. It should be more in the vicinity of 10 tons/mile.

crossing; however, significance may be low because the line closely follows existing access roads and developments.

(3) Human Interest Values

Regardless of where the proposed line is constructed, there will be a long term loss to the visual resource.

As previously indicated, transmission lines have seldom been abandoned and removed. If future events make it possible to dismantle the line, some scars caused by heavy equipment may never heal, due to the exposure of subsoils that are incapable of supporting vegetation. Even with reclamation practices, there will be scars. These scars will cause a negative irreversible effect upon the visual resource.

B. ENVIRONMENTAL IMPACTS OF THE ALTERNATIVE ROUTES

The impacts identified concerning the proposed action are basically the same for the alternative routes except where specifically noted in the following analysis.

1. Anticipated Impacts

a. Non-Living Components

(1) Air Quality

Dust generation in the vicinity of the alternative No. 2 route will be more pronounced because of the vast alkali flat areas which would be crossed. Such areas are particularly susceptible to disturbance of their thin surface crust and subsequent wind erosion.

(2) Land - soils

Within alternative 1 soil impact would be similar to the proposed route regarding impacts because topography and soils are similar. Because stable bedrock supports soil groups C and E, alternative 1 and the proposed right-of-way offer the least soil problems attributed to construction and maintenance.

Alternative route No. 2 is 99-1/2 miles long and transects group C soils for about 1/3 of the total distance. Construction disturbance could adversely affect the access and also the stability of the tower by wind deposited sand. Also, the deep sand could present a physical foundation support problem to the tower bases. High soil pH has some adverse effects on concrete and aluminum, and the pH in this area averages around 8.5 to 9.5. Residual and wind blown material may have a corrosive effect on the towers, and also on the concrete bases.

b. Living Components

(1) Animal Life

Within Alternative No. 1 the total disturbance area will be decreased to a range of 179 to 200 acres.

Deer winter ranges are almost entirely avoided as well as most other species habitat concentration areas. The Alternative 1 route traverses more raptor nesting habitat than the proposed route. Because of location, the route has the greatest possibility of causing disturbance to nesting birds which could lead to abandonment of nesting sites (eyries) in the area west of Wadsworth and at Lone Mountain.

Within Alternative Route No. 2 the total disturbed habitat area will increase to a range of 193 to 220 acres. Some disturbance to wild horses may occur in the Virginia Range. Also, some disturbance to deer may occur in the Virginia Range wintering area and raptors during the nesting season in the Rochester Canyon area.

(2) Human Interest Values

(a) Visual Resources

Alternative 1

This alternative route, upon leaving the Tracy Generating Plant immediately crosses Interstate 80, paralleling it and the scenic Truckee River Canyon. The entire first 16.5 miles traverses a Class II - highly significant visual resource area. Impacts expected are numerous and would result in significant negative visual effects. The location of the line entirely in the foreground/middleground visual

zone indicates that structure reflection, vegetation manipulation, construction disturbance, road cut banks, and highway crossings would all have strong visual influence in the area.

The line then enters into 31.5 miles of a Class IV - significant visual area; however, additional impacts can be expected because of its general location in the foreground zone. At a point 4 miles west of the Interstate 80 - State Highway 95 junction, the line crosses 2 miles of a Class III area known as the columnar basalts. This stretch, although short, is critical because of the uniqueness of this land form. The alternate route is located on the Interstate side of the area, a foreground/middleground situation thus degrading the visual appeal of the columnar basalts.

The line then shifts away from Interstate 80 into a less critical zone for approximately 8 miles as it re-enters the Class IV area, returning to a closer highway location. It remains in Class IV for the final 40.5 miles, crossing Highway 48 (moderate use) 3 miles east of Lovelock. At a point approximately 6 miles north of Lovelock, it meets the proposed route and follows that corridor line into Oreana. These highway crossings, especially Interstate 80, are critical as they are viewed by large volumes of traffic. Reflection and straight line effects due to road construction and vegetation removal can be expected.

Alternative 2

This alternative leaves the Tracy Station to the southeast,

traversing 10 miles of a Class II - highly significant visual resource area. Visual impacts in this zone can be expected to be substantial, especially to those traveling Interstate 80 to the east, who will be able to observe several tower structures in a line climbing up from the Truckee River flood plain and over the Virginia Range. Reflection, skylighting and road and tower site construction activities can all be expected to impact the visual resource. The line then would enter 2-1/2 miles of a Class III - moderately significant visual resource area in the Virginia Foothills. Similar impacts would be expected here, especially linear intrusions due to vegetation removal and road construction when this area is viewed as a far foreground/middleground visual zone from Highway Alternate 95. The line would then enter a Class IV area for the next 40 miles, crossing two sections of State Highway Alternate 95 and then paralleling Interstate 80 7-8 miles to the south. The route continues for 29 miles to the scenic Mopung Hills, where it traverses 1-1/4 miles of this Class III area. From here, the alternative continues for 33 miles to the south of the West Humboldt Range, re-entering a Class III area in the main Humboldt Range, and continuing into the last 3 miles of Class IV just prior to termination at the Oreana substation. Impacts at the highway and road crossings can be expected to be the same as or similar to those previously mentioned. The Class III area in the Humboldt Range suggests potential for a background straight line effect which could develop due to road location, and vegetation removal. Site specific problem locations might also be evident at tower site developments.

(b) Educational/Scientific

Alternative No. 1 crosses close to the columar basalt rock columns located in the southern end of the Trinity Mountains (T. 25 N., R. 29 E.). Impacts in this location are expected to be basically visual; it is possible that the site may be destroyed during construction.

This corridor also follows the Stevens-Donner route to the intersection of Interstate 80 and Highway 95. It then follows the direction of the locations to Oreana. The historic trails follow or have been established as present-day highways.

An isolated grove of shade trees located at Black Knob Spring, T. 28, R. 34, may be impeded by Alternative No. 2. Any construction at this ecological area would greatly depreciate its aesthetic appeal.

The degree of impact to these areas depends largely upon specific pole placement sites.

Alternative No. 2 intersects the Mormon-Carson route adjacent to Highway 95 just south of the Mopung Hills. Visual impacts to the historic trails will be low, as they basically follow or have been established as present-day highways.

(c) Communications

Sierra Pacific Power Co. has reported that a recent study done for them reveals significant impact probability from locating high voltage lines in the vicinity of telephone-

telegraph lines. Based upon the information, communication lines in the Truckee Canyon would require relocation in an underground cable before the Alternative No. 1 230 KV line could utilize the existing utility corridor through the canyon. Alternative No. 2 should also have a similar probable impact upon the trans-continental telephone lines located on the east toe of the West Humboldt mountains.

(d) Mining

Alternative No. 2 passes through the Rochester mining district and could have significant impact upon active placer operations.

(e) Agriculture

Alternative No. 1 crosses two potential agriculture areas on the Truckee River.

(f) Federal Agency Planning - BIA

Alternative No. 1 crosses Dodge Flat just north of Wadsworth on the Pyramid Lake Indian Reservation. The Tribal Council and BIA have expressed concern that a right-of-way over the area could create conflicts with "on the shelf" agricultural and housing development plans for the area.

(3) Hazards to Human and Animal Health and Safety

The probability of bird collision with power cables or towers during inclement weather is greater on the Alternative No. 2 route because this route traverses within the vicinity of five important waterfowl areas and crosses raptor wintering habitat. Alternative No. 1 also traverses near two waterfowl areas and crosses raptor wintering habitat; however, the probability for impact is substantially less than Alternative No. 2.

2. Possible Mitigating or Enhancing Measures

Because the impacts of the possible routes are similar, the mitigating measures are likewise similar. Only specific differences are addressed for the alternatives in the sections that follow.

a. Non-Living Components

Land - Soils

Erosion control measures are the most effective mitigating measures possible for Alternatives Nos. 1 and 2. The contractor should be required to use existing roads as much as possible during construction and maintenance of the power line. New road construction should be kept to a minimum. Any new roads needed for line maintenance should be waterbarred and proper drainage installed. Refer to the proposed action section.

b. Living Components

(1) Animals

(a) Construction activity during the period of 3/31 through 6/30 should be restricted to prevent disturbance to nesting prairie falcon and golden eagle and possible eyrie abandonment.

The line segments affected would be:

Alternative No. 1 -

Pah Rah Range

T. 20 N., R. 22 E., Sec. 21, 22, 23, 24 and 28

T. 20 N., R. 23 E., Sec. 13, 14, 15, 16, 17, 18 and 19

Alternative No. 2 -

Rochester Canyon

T. 28 N., R. 33 E., Sec. 3, 11, 13, 24, 25 and 36

(2) Hazards to Humans and Animals

The transmission line, Alternative 2, should not be located in the vicinity of the five heavily used waterfowl management areas. A transmission line within a heavily utilized waterfowl movement area can lead to a significant amount of waterfowl losses through impact with the phase lines. The alternative 1 and 2 routes are from two to twelve miles of waterfowl management areas. Transmission line location should avoid crucial raptor wintering areas, specifically an area located in the Humboldt drainage area in the vicinity of Lovelock on the alternative 1 route, as impact with the phase lines is a significant cause of raptor mortality.

3. Recommendations for Mitigation or Enhancement

The possible mitigating measures discussed previously and those for the proposed route, where applicable, are recommended and must be employed if an alternative route is selected.

a. Visual Resources

(1) Alternative No. 1

(a) Class II - Highly Significant

Impacts: All impacts discussed under Recommendations, Proposed Route, Class II, will take place in this alternative. The overall degree of impacts are greater within this alternative due to a large portion of the line being located in the immediate foreground/middleground visual zone along Interstate 80.

Recommended Mitigation: All recommendations discussed in Class II for the proposed route will apply here.

(b) Class III - Moderately Significant

Impacts: The line would cross approximately 2 miles of the unique columnar basalts and would be visible from Interstate 80 through this area. This would likely result in reflection and noticeable surface disturbance problems.

Recommended Mitigation: Relocate line on back side of the columnar basalts taking advantage of a natural land form screen.

(c) Class IV - Significant

Impacts: All impacts discussed under Recommendations, Proposed Route, Class IV, will take place in this alternative. Again, the degree of impacts may be greater due to the fact that the majority of this alternative in Class IV traverses the foreground/middleground visual zone.

Recommended Mitigation: Recommendations as discussed in Class IV for the proposed route will apply here.

(2) Alternative No. 2

(a) Class II - Highly Significant

Impact: All impacts proposed under Recommendations, Proposed Route, Class II, will take place in this area.

Recommended Mitigation: All recommendations as discussed in Proposed Route, Class II, would apply.

(b) Class III - Moderately Significant

Impacts:

* Reflection of aluminum towers and conductors from important observer positions.

* Long views of the straight alignment as observed from Interstate 80 and State Highway Alt. 95.

* Silhouetting of transmission line and towers against the sky.

* Surface disturbance due to road cutbanks and tower construction sites on steep slopes.

Recommended Mitigation:

* Treat aluminum structures in key areas with a dulling agent.

* Take advantage of vegetation and land forms for screening.

* Construct line at base of land form changes rather than in valley bottoms.

* Rehabilitate construction scars by contouring procedures in order to regain as much natural character as possible.

(c) Class IV - Significant

Impacts: All impacts discussed under Recommendations, Proposed Route, Class IV, will apply in this alternative.

Recommended Mitigation: Recommendations as discussed in Proposed Route, Class IV, would generally be applied here.

b. Preservation of Archeological Values

Prior to construction, the applicant must make survey and inventory of archaeological, paleontological and historical sites within the area to be occupied by the right-of-way and the access roads. Results of this survey will be provided to the authorized

officer. The authorized officer may require applicant to relocate the proposed transmission line facilities in order to avoid destruction of archaeological, paleontological or historic values or to delay construction until salvage operations are completed. All costs of inventory, survey and salvage operations must be borne by applicant.

The applicant must be particularly alert in construction operations to take all reasonable and necessary precautions to protect and preserve historic and prehistoric ruins and artifacts on or adjacent to the right-of-way. Should such sites, ruins or artifacts be discovered during construction, the applicant must immediately suspend construction work involving the area in question and advise the authorized officer of the suspected values. The authorized officer must promptly have the area inspected to determine significance of the values and appropriate action to follow - (salvage, etc., and resumption of construction). Cost of any salvage work must be borne by the applicant.

4. Residual Impacts

Remaining impacts associated with the alternative routes following application of mitigating measures are basically the same as described under the proposed action section.

a. Land Use Suitability

Suitability of the land base to support the construction of a power transmission line built to 230/345 KV specifications requires that the physical aspect of the land unit be stable and possess sufficient bearing strength. In this regard, that area along

the Hot Springs Mountains from the Mopung Hills, southwest along the southern alternative route (Alternative 2) to four miles north of Hazen, Nevada, presents a broad area characterized by sandy soils and some sand dunes which will create problems for construction activities. Although engineering design can somewhat alleviate these problems, it is the unknown residual impacts of construction along this southern alternative route that cannot be answered.

5. Relationship Between Short-Term Uses of Man's Environment and the Maintenance of Long-Term Productivity

Refer to subject in the proposed action section.

6. Irreversible and Irretrievable Commitments of Resources

Land - Soil

The amount of soils that will be disturbed by construction along alternative route 1 is 200 acres without helicopter installation, or 179 acres with helicopter installation.

The amount of soils that will be disturbed by construction along alternative route 2 is 220 acres without helicopter installation, or 193 acres with helicopter installation.

The areas disturbed represent a long term change of the soil surface characteristics and associated plant communities.

C. ENVIRONMENTAL IMPACTS OF THE DENY RIGHT-OF-WAY ALTERNATIVE

1. Anticipated Impacts

If the proposed action is denied and the transmission line is not constructed, the impacts identified for the proposed route or alternative routes will not occur. Implementing this alternative would likely lead to the establishment of small, privately owned petroleum fuel powered generation stations located at or near demand centers.

The impacts of these small generators cannot be precisely defined at this time due to lack of information on possible location, size, numbers, type of fuel used, and so on. Therefore, this alternative will not be addressed in depth in this analysis. With substitution of small generators, which would most likely occur as a result of this alternative, impacts of varying significance and magnitude would occur throughout the service area as energy demands are satisfied.

Assuming the present and projected electrical load requirements are correct, the "no action" alternative would have a detrimental effect on an expanding agricultural sector, mining sector and customer sector.

The availability of electrical energy is desirable to the various economic factors which provide employment, goods and services for the region's inhabitants (Lovelock district).

While power availability and reliability does not in itself cause residential, commercial or industrial development, or the resulting economic and population growth, the lack of electrical energy would inhibit these activities.

2. Possible Mitigating or Enhancing Measures

If the application were denied, no mitigating measures would be required.

3. Recommendations for Mitigation or Enhancement

None.

4. Residual Impacts

Same as Anticipated Impacts.

5. Relationship Between Short-Term Uses of Man's Environment and Maintenance of Long-Term Productivity

Denial of the right-of-way will probably result in a search for alternate sources of power as demand increases. If additional power remains unavailable, there are two possible results: growth in the area could be curtailed, or if substantial growth does occur, power might be in short supply.

6. Irreversible and Irretrievable Commitments of Resources

None.

PERSONS, GROUPS, AND GOVERNMENT AGENCIES CONSULTED

SECTION IV

IV. PERSONS, GROUPS AND GOVERNMENT AGENCIES CONSULTED OR CONTACTED

The list that follows shows agencies and people contacted or consulted in the preparation of the Tracy to Oreana E.A.R.

A. - Federal Agencies

Soil Conservation Service
Winnemucca, Nevada

Mr. Lloyd Osborne
Newlands Project Office
Bureau of Reclamation
Carson City, Nevada

Mr. Robert Donlevy
Bureau of Indian Affairs
Stewart, Nevada

U.S. Fish and Wildlife Service
Federal Building
Reno, Nevada

Mr. Richard Eckert
Agriculture Research Service
University of Nevada
Reno, Nevada

B. - Nevada State Agencies

Mr. Hugh Ricci & Mr. Robert Smith
Environmental Protection Section
Department of Human Resources
Carson City, Nevada

Division of Water Resources
State Engineers Office
Carson City, Nevada

Mr. Marshall Humphries & Mr. Al Scott
Nevada State Parks
Department of Natural Resources
Carson City, Nevada

Mr. Bob Oakleaf
Nevada State Fish and Game Department
Stead, Nevada

Mr. Ray Corlett & Mr. Sam Millazzo
Region I Office
Nevada State Fish and Game Department
Fallon, Nevada

Mr. Nick Papez & Mr. Larry Barngrover
State Office
Nevada State Fish and Game Department
Reno, Nevada

Mr. Bruce Arkell
State Planning Coordinator
Office of the State Planning Coordination
Carson City, Nevada

Mr. John McNeely & Mr. Dick Massey
Recreation Staff
Department of Natural Resources
University of Nevada
Reno, Nevada

C. - Groups and Persons Contacted or Consulted

Ms. Tina Nappe
Ms. Marjorie Sill
Mr. Dave Boroughf
Toiyabe Chapter of the Sierra Club

Mr. Arthur L. Floyd
National Railroad Passenger Corporation
Western Regional Sales Manager
Los Angeles, California

The draft EAR was sent to the following list of agencies and groups for their review. Responses received are indicated by an asterisk. Copies of written responses are included in Appendix 9.

* Bonneville Power Administration
* Bureau of Indian Affairs
* U.S. Fish and Wildlife Service
* Bureau of Reclamation
Soil Conservation Service
Churchill County Planning Commission
Pershing County Board of County Commissioners
* Pershing County Regional Planning Commission
Pyramid Lake Paiute Tribal Council
Nevada Archaeological Society
Lahontan Audubon Society
Nevada Wildlife Federation
* Sierra Club, Toiyabe Chapter
Foresta Institute for Ocean and Mountain Studies
Nevada Open Spaces Council
* Nevada Outdoor Recreation Association
Nevada Organization for Wildlife
* Nevada State Clearinghouse (State Agencies)
* Sierra Pacific Power Company

V. INTENSITY OF PUBLIC INTEREST

To date, little public interest in the proposed action has been evident. Concurrent with the preparation of the draft EAR, notice of the proposal was made by BLM through newspaper articles, an A-95 notification to the Nevada State Clearinghouse, and through individual contacts. Sierra Pacific held public meetings on the proposal and issued news releases through local newspapers in the area.

Subsequent to the distribution of the draft EAR (see Section IV), further newspaper coverage was obtained by BLM. Very little public comment has emerged since the draft became available for review. Written comments that were received were from public agencies on the local, state and federal level; none were received from the various environmental groups contacted. Thus, there does not appear to be a great deal of public interest in the proposal.

Those written comments which were received have been reviewed and to the extent possible the recommended changes have been incorporated into the text of the EAR. For the most part these comments were editorial in nature and did not challenge or alter either the analysis presented or the conclusions derived from that analysis.

VI. PARTICIPATING AGENCY STAFF

Ed Tilzey - Wildlife Specialist - Burley, Idaho District Office

Ron Fellows - Realty (Econ) Specialist - Elko, Nevada District Office

Ed Dimick - Watershed Specialist - Winnemucca, Nevada District Office

Larry Hand - Outdoor Recreation Planner - Winnemucca, Nevada District Office

Julie Elfving - Planning & Environmental Coordinator - Carson City, Nevada District Office

Cheryl Hoke - Geologist - Nevada State Office

Bob Ross - Landscape Architect - Nevada State Office

Jan Bedrosian - Public Information Specialist - Nevada State Office

Dennis Anderson - Cartographic Technician, Nevada State Office

George Ramey - Planning & Environmental Coordinator - Elko, Nevada District Office

Alice Williams - Secretary, Nevada State Office

VII. Summary Conclusion

This analysis has identified the following residual impacts which may be expected if the proposed right-of-way is granted.

- Surface disturbance resulting from construction and maintenance access will result in increased soil erosion potential.
- Vegetation destroyed during construction or maintenance may be replaced by other species, or may never be replaced.
- Existence of the line would present a potential collision hazard for birds.
- Raptor nesting sites may be abandoned if construction or maintenance activity takes place in the immediate vicinity during nesting periods.
- An additional visual intrusion will be placed on the existing landscape.

Establishment of the proposed right-of-way is not expected to significantly affect long term productivity nor to foreclose any options of resource use for future generations.

As previously stated, there has been little public interest shown to date regarding this project.

APPENDICES

SECTION V

APPENDIX

APPENDIX 1

Soils

Soils in the study area are classified according to the new national soil classification system in this appendix. Three of the possible ten orders in the system are represented here; Aridisols, Entisols, and Mollisols. These names are synonomous with Sierozem, Regosol and Brown respectively in the old soil classification system. Aridisols occur in cool, dry regions. They are generally well developed, light-colored, moderately deep, over hardpans, gravel, or bedrock; well drained and moderately alkaline. Entisols also occur in cool, arid regions, and are similar to Aridisols except they are weakly developed (younger), well to excessively drained, shallow to deep over bedrock or gravel, light-colored and neutral to very strongly alkaline. Mollisols are similar to the other two orders except they receive more water, and as a result, contain more organic matter and usually produce more natural vegetation. A further breakdown of the soil Orders into Great Groups and their respective definitions is found in Appendix 1, page 1-3.

Group A

The Great Group names in this soil group include Nadurargids, Natrargids, Torrifluvents, and Torriorthents. The geologic material consists of mixed eroded alluvium that has washed and blown in from the surrounding mountains and includes volcanics, metamorphics, and sedimentary material. Over-impregnation with many nutrient salts is a problem that adversely effects vegetation in this group.

Group B

Some of the Great Groups of soils that occur in this unit are Torripsamments, Natrargids, Nadurargids, and Argiaquolls. Most of these

soils are formed from water-borne material that is derived from volcanic, metamorphic, and some sedimentary rocks.

Group C

Typical Great Groups of soils in these areas are Torripsamments, Haplargids, Durorthids, Camborthids, and Durargids. They have formed from water and wind deposits washed and blown in from the adjacent mountains over a relatively longer period of time than either Group A or B soils. Most Group C soils are low in the primary plant nutrient nitrogen because of the low annual precipitation.

Group D

A typical Great Group soil classification in the area is the Torripsamments. Geologic structure consists of deep aeolian (wind transported) sand. Carbonates and other salts are present.

Group E

Some of the Great Group of soils occurring in this unit are Haplargids, Camborthids, and possibly some Calciorthids. Geologic structure consists of rock strata ranging from rhyolites to unconsolidated volcanic ash. Nutrients are plentiful except for available nitrogen which is a function of annual precipitation. The soils are well drained and free of corrosive agents.

Soil Great Group Description 1/

Young Weakly Developed Soils

(Alluvials and Regosols - 1938 classification)

Torrifluvents

These are alluvial soils in dry climates that are flooded infrequently. They occur on river bottoms and can be high value agriculture soils when irrigation water is available. They are mostly deep, medium to coarse textured.

Torriorthents

These are dry, or salty alluvials (water formed) or colluvial (gravity formed) soils in cool or hot arid climates. They usually occur on moderate to strong slopes (9 to 16 per cent) and are neutral or calcareous. They are practically never flooded and are well drained. They range in depth from shallow to deep.

Torripsamments

Same as Torriorthents except these soils are on stabilized, or partially stabilized sand dunes.

Older Well Developed Soils

(Sierozem and Browns 1938 Soil Classification)

Durorthids

Moderately deep over silica hardpans, well drained, and quite extensive, medium textured throughout. Slopes are usually between 0 to 15 per cent, and neutral to strongly alkaline.

Camborthids

Same as above except no duripan within 1 meter of the surface.

1/ From Soil Conservation Publication 8-21-73 and Central Lahontan Basin soil survey by SCS and Nevada Department of Conservation and Natural Resources.

Durargids

Same as Durorthid except subsoil contains significant amount of silicate clays.

Haplargids

Same as Durargids except no duripan is present.

Argiaquolls

Moderately deep over gravel or deep, dark-colored soils along floodplains, where water table has more influence on high yielding native vegetation production than on any of the above soils. These were known as Humic Gley soils in earlier classification.

Natrargids

Deep soils with a clayey, strong structured subsoil and a natric horizon (more than 15 per cent saturation of exchangeable sodium).

Nadurargids

Shallow or moderately deep over clayey subsoil, or silica cemented hardpan. Has a natric horizon and a strong structured subsoil.

Calciorthids

Shallow to moderately deep over a strong lime concentration horizon. The limited rainfall is unable to remove the lime completely from the surface 7 inches unless textures are sandy. The soils are commonly nearly white. In the old 1938 classification they were known as Calcisols.

APPENDIX 2

Vegetation

A. Salt Desert Shrub Vegetative Type - Shadscale/Budsage Community

Shadscale	*Atriplex confertifolia*
Budsage	*Artemisia spinescens*
Big sagebrush	*Artemisia tridentata*
Yellowbrush	*Chrysothamnus viscidiflorus* var *puberulus*
Yellow rabbitbrush	*Chrysothamnus nauseosus*
Mormon tea	*Ephedra nevadensis*
Spiny hopsage	*Grayia spinosa*
Cottonthorn horsebrush	*Tetradymia spinosa*
Cheatgrass	*Bromus tectorum*
Indian ricegrass	*Oryzopsis hymenoides*
Sandberg bluegrass	*Poa secunda*
Squirrel tail	*Sitanion hystrix*
Gooseberry-leaf globemallow	*Sphaeralcea grossulariaefolia*
Desert mentzelia	*Mentzelia multiflora*
Clasping pepperweed	*Lepidium perfoliatum*
Filaree	*Erodium cicutarium*
Tansy mustard	*Descurainia sophia*
Thickstem wild cabbage	*Caulanthus crassicaulis*
Longleaf phlox	*Phlox longifolia*
Skeletonplant	*Lygodesmia spinosa*
Low fleabane	*Erigeron pumilus*
Pursh locoweed	*Astragalus purshii*

B. Dryland Greasewood/Shadscale Community

Dryland greasewood	*Sarobatus baileyi*
Shadscale	*Atriplex confertifolia*
Bud sage	*Artemisia spinescens*
Spiny hopsage	*Grayia spinosa*
Mormon tea	*Ephedra nevadensis*
Winterfat	*Eurotia lanata*
Cottonthorn horsebrush	*Tetradymia spinosa*
Littleleaf horsebrush	*Tetradymia glabrata*
Low rabbitbrush	*Chrysothamnus viscidiflorus*
Dalea	*Dalea polyadenia*
Burro brush	*Hymenoclea salsola*
Cheatgrass	*Bromus tectorum*
Squirrel tail	*Sitanion hystrix*
Indian ricegrass	*Oryzopsis hymenoides*
Needle and thread	*Stipa comata*
Desert needlegrass	*Stipa speciosa*
Fluff grass	*Tridens pulchella*
Halogeton	*Halogeton glomeratus*
Tansy mustard	*Descurainia sophia*
Gooseberry-leaf globemallow	*Sphaeralcea grossulariaefolia*
Phacelia	*Phacelia* spp.
Snowball sand verbena	*Abronia fragrans*
Desert mentzelia	*Mentzelia multiflora*
Yellow spiderwort	*Cleome lutea*
Prince's plume	*Stanleya pinnata*
Russian thistle	*Salsola kali tenuifolia*

C - Big Greasewood Community

Big greasewood	*Sarcobatus vermiculatus*
Four-wing saltbush	*Atriplex canescens*
Quailbrush	*Atriplex lentiformis*
Shadscale	*Atriplex confertifolia*
Green molly	*Kochia americana*
Rubber rabbitbrush	*Chrysothamnus nauseosus*
Inkweed	*Suaeda torreyana ramosissima*
Budsage	*Artemisia spinescens*
Spiny hopsage	*Grayia spinosa*
Dalea	*Dalea polyadenia*
Spiny horsebrush	*Tetradymia spinosa*
Squirreltail	*Sitanion hystrix*
Saltgrass	*Distichlis stricta*
Alkali sacaton	*Sporobolus airoides*
Great basin wildrye	*Elymus cinereus*
Halogeton	*Halogeton glomeratus*
Pickleweed	*Allenrolfea occidentalis*
Tansy mustard	*Descurainia sophia*
Clasping pepperweed	*Lepidium perfoliatum*

D. Northern Desert Shrub Vegetative Type

Big sagebrush	*Artemisia tridentata*
Low sagebrush	*Artemisia arbuscula*
Bud sage	*Artemisia spinescens*
Spiny hopsage	*Grayia spinosa*
Bitterbrush	*Purshia tridentata*
Bittercherry	*Prunus emarginata*
Cottonthorn horsebrush	*Tetradymia canescens*
Littleleaf horsebrush	*Tetradymia glabrata*
Rubber rabbitbrush	*Chrysothamnus nauseosus*
Yellowbrush	*Chrysothamnus viscidiflorus* var *puberulus*
Prickly phlox	*Leptodactylon pungens*
Skeleton plant	*Lygodesmia spinosa*
Shrubby eriogonum	*Eriogonum spp.*
Mormon tea	*Ephedra nevadensis*
Squaw tea	*Ephedra viridis*
Sandberg bluegrass	*Poa secunda*
Squirreltail	*Sitanion hystrix*
Cheatgrass	*Bromus tectorum*
Indian ricegrass	*Oryzopsis hymenoides*
Great Basin wildrye	*Elymus cinereus*
Bluebunch wheatgrass	*Agropyron spicatum*
Desert needlegrass	*Stipa speciosa*
Thurber's needlegrass	*Stipa thurberiana*
Galleta	*Hilaria jamesii*
Douglas chaenactis	*Chaenactis douglasii*
Lupine	*Lupinus spp.*
Mules ears	*Wyethia amplexicaulis*
Pursh locoweed	*Astragalus purshii*
Fleabane	*Erigeron andersonii*
Clasping pepperweed	*Lepidium perfoliatum*
Hoary aster	*Machaeranthera canescens*

Appendix 3

Animal Life

A. Threatened or Endangered Wildlife

Species	Habitat Information
1. Lahontan cutthroat trout *Salmo clarki henshewi*	Freshwater streams, formerly common game fish, now with restricted distribution.
2. American peregrine falcon *Falco Peregrinus anatum*	Cliffs and canyons for nesting; feeds on waterfowl and shorebirds. Occasional suspected sightings.
3. Southern bald eagle *Haliaectus L. leucocephalus*	Transient bird with occasional sightings during winter.

Rare and Endangered Birds of Nevada Inhabiting the Area

1. American peregrine falcon

2. Spotted bat

B. Birds of the Area

		Relative * Abundance
	Grebes	
	Eared grebe	C
1/	Western grebe	C
	Cormorants and Pelicans	
1/	White pelican	A
	Herons, Bitterns, Egrets, Ibises	
	Great blue heron	A
	Snowy egret	A
1/	Black-crowned night heron	C
	American bittern	C
1/	White-faced ibis	O
	Swans, Geese and Ducks	
	Trumpeter swan	O
	Whistling swan	C
	Canada goose	A
	Mallard	A
	Gadwall	A
	Pintail	A
	Green-winged teal	A
	Blue-winged teal	O
	Cinnamon teal	A
	American widgeon	A
	Northern shoveler	A
	Redhead	A
	Canvasback	C
	Common goldeneye	C
	Bufflehead	C
	Ruddy duck	C
	Common merganser	A

* A - Abundant - occurs in large numbers
C - Common - occurs regularly in moderate numbers
O - Occasional - occurs in seasonal distribution or in limited numbers
R - Rare - rarely found or in very limited numbers
1/ - Listed on National Audubon Society's "Blue List" as species with declining populations.

		Relative Abundance*
	Vultures, Hawks and Falcons	
	Turkey vulture	C
	Goshawk	O
1/	Sharp-shinned hawk	C
1/	Cooper's hawk	C
	Red-tailed hawk	C
1/	Swainson's hawk	C
	Rough-legged hawk	A
1/	Ferruginous hawk	C
	Golden eagle	C
	Bald eagle	R
1/	Marsh hawk	A
1/	Prairie falcon	C
1/	American kestrel	C
	Quail, Pheasant, Partridges, Grouse	
1/	Sage grouse	A
	California quail	C
	Ring-necked pheasant	O
	Chukar	A
	Gray partridge	A
	Cranes	
	Sandhill crane	C
	Rails and Coots	
	Virginia rail	O
	Common gallinule	O
	American coot	A
	Plovers, Snipe and Sandpipers	
	Killdeer	A
	Common snipe	C
	Long-billed curlew	O
	Spotted sandpiper	O
	Willet	C
	Lesser yellowlegs	C
	Least sandpiper	A
	Long-billed dowitcher	C
	Western sandpiper	C
	Avocets, Stilts, Phalaropes	
	American avocet	A
	Black-necked stilt	A
	Wilson's phalarope	C

		Relative * Abundance
	Gulls and Terns	
	California gull	C
	Forester's tern	C
	Pigeons and Doves	
	Rock dove	C
	Mourning dove	A
	Owls	
1/	Barn owl	C
	Great horned owl	C
1/	Burrowing owl	C
	Long-eared owl	C
	Short-eared owl	C
	Poor-will	C
	Goatsuckers	
	Common nighthawk	A
	Swifts	
	White-throated swift	C
	Hummingbirds	
	Broad-tailed hummingbird	O
	Kingfisher	
	Belted kingfisher	C
	Woodpeckers	
	Common flicker	A
	Flycatchers	
	Western kingbird	A
	Traill's flycatcher	C
	Gray flycatcher	C
	Larks	
	Horned lark	A

	Relative * Abundance
Swallows	
Violet-green swallow	O
Barn swallow	C
Cliff swallow	C
Jays, Magpies and Crows	
Scrub jay	C
Black-billed magpie	A
Common raven	A
Pinyon jay	C
Verdin and Bushtits	
Common bushtit	O
Dippers	
Dipper	C
Wrens	
House wren	C
Long-billed marsh wren	C
Rock wren	C
Mockingbirds and Thrashers	
Sage thrasher	C
Thrushes, Bluebirds, Solitaires	
American robin	A
Western bluebird	C
Mountain bluebird	C
Gnatcatchers and Kinglets	
Blue-grey gnatcatcher	O
Ruby-crowned kinglet	O
Pipits	
Water pipit	O
Waxwings	
Cedar waxwing	O

		Relative * Abundance
Shrikes		
1/	Loggerhead shrike	A
Starlings		
	Starling	A
Vireos		
	Solitary vireo	C
Warblers		
	Orange-crowned warbler	C
1/	Yellow warbler	C
	MacGilliuray's warbler	C
	Wilson's warbler	C
Weaver Finches		
	House sparrow	C
Meadowlarks, Blackbirds, Orioles		
	Western meadowlark	C
	Yellow-headed blackbird	A
	Red-winged blackbird	C
	Brewer's blackbird	A
	Brown-headed cowbird	C
Tanagers		
	Western tanager	C
Grossbeaks, Sparrows, Finches, Buntings		
	Evening grosbeak	C
	House finch	C
	American goldfinch	C
	Lesser goldfinch	C
	Green-tailed towhee	C
	Rufous-sided towhee	C
	Savannah sparrow	A
	Lark sparrow	C
	Black-throated sparrow	C
	Sage sparrow	C
	Chipping sparrow	C
	Brewer's sparrow	C
	White-crowned sparrow	C
	Fox sparrow	C
	Song sparrow	C

C - Mammals Common to the Area

Order Chiroptera

Big myotis	*Myotis lucifungus*
Yuma myotis	*Myotis yumanensis*
Long-eared myotis	*Myotis evotis*
Hairy-winged myotis	*Myotis volans*
California myotis	*Myotis californicus*
Small-footed myotis	*Myotis subulatus*
Silver-haired bat	*Lasionycteris noctivagans*
Western pipistrelle	*Pipistrellus hesperus*
Big Brown bat	*Esptesicus fuscus*
Hoary bat	*Lasiurus cinereus*
Big-eared bat	*Plecotus townsendi*
Pallid bat	*Antrozous pallidus*
Mexican free-tailed bat	*Tadarida brasiliensis*

Order Carnivora

Raccoon	*Procyon lotor*
Long-tailed weasel	*Mustela frenata*
Mink	*Mustela vison*
River otter	*Lutra canadensis*
Badger	*Taxidea taxus*
Spotted skunk	*Spilogale putorius*
Striped skunk	*Mephitis mephitis*
Coyote	*Canis latrans*
Kit fox	*Vulpes macrotis*
Gray fox	*Urocyon cinereoargenteus*

Order Rodentia

Towsend ground squirrel	*Citellus townsendii*
Antelope ground squirrel	*Citellus leucurus*
Golden-mantled ground squirrel	*Citellus lateralis*
Least chipmunk	*Eutamias minimus*
Little pocket mouse	*Perognathus longimembris*
Townsend pocket gopher	*Thomomys Townsendii*
Great Basin pocket mouse	*Perognathus parvus*
Long-tailed pocket mouse	*Perognathus formosus*
Dark kangaroo mouse	*Microdipodops megacephalus*

Order Rodentia (continued)

Pallid kangaroo mouse	*Microdipodops pallidus*
Ord kangaroo rat	*Dipodomys ordii*
Great Basin kangaroo rat	*Dipodomys microps*
Merriam kangaroo rat	*Dipodomys merriami*
Desert kangaroo rat	*Dipodomys deserti*
Beaver	*Castor canadensis*
Western harvest mouse	*Reithrodontomys megalotis*
Canyon mouse	*Peromyscus crinitus*
Deer mouse	*Peromyscus maniculatus*
Pinyon mouse	*Peromyscus truei*
Northern grasshopper mouse	*Onychomys leucogaster*
Southern grasshopper mouse	*Onychomys torridus*
Desert woodrat	*Neotoma lepida*
Bushy-tailed woodrat	*Neotoma cinerea*
Montane vole	*Microtus montanus*
Long-tail vole	*Microtus longicaudus*
Sagebrush vole	*Lagurus curtatus*
Muskrat	*Ondatra zibethica*
Black rat	*Rattus rattus*
House mouse	*Mus musculus*
Porcupine	*Erethizon dorsatum*

Order Artiodactyla

Mule deer	*Odocoileus hemionus*
Prong-horned antelope	*Antilocapra americana*

Appendix 4

A - Designated Wildlife (Waterfowl) Areas

Area	Acreage	Management Agency
Fernley Wildlife Management Area	13,669	Nevada Department of Fish and Game
Sillwater Refuge	24,203	U.S. Fish and Wildlife Service
Stillwater Wildlife Management Area	119,663	Nevada Department of Fish and Game
Fallon Refuge	17,902	U.S. Fish and Wildlife Service
Humboldt Wildlife Management Area	36,270	Nevada Department of Fish and Game
TOTAL	211,707	

Waterfowl Harvest

	1968	1969	1970	1971	1972	1973
Fernley Wildlife Management Area	4,680	4,236	2,380	4,635	983	----
Stillwater Wildlife Management Area	13,986	26,273	31,660	32,783	23,91	----
Humboldt Wildlife Management Area	----	2,121	2,270	1,433	925	1,338

B - Nongame Bird Inventory *
Humboldt Wildlife Management Area
May 21, 1974

Western grebe	44
White pelican	96
Blue heron	52
Great egret	35
Snowy egret	273
Black-crowned night heron	3
White-faced ibis	366
Killdeer	17
Long-billed curlew	2
Lesser yellowleg	27
Sandpiper (Species Unknown)	116
Long-billed howitcher	79
American avocet	85
Black-necked stilt	65
Wilson's phalarope	16
California gull	73
Forester's tern	80
Black tern	7
Magpie	Numerous
Common raven	11
Yellow-headed blackbird	Numerous
Red-winged blackbird	Numerous

* Aerial Survey - only those species classified were recorded.

C - BREEDING PAIR COUNT DATA

HUMBOLDT WILDLIFE MANAGEMENT AREA

Year	Mallard	Pintail	Cadwall	Redhead	Cinn. Teal	Ruddy	Misc.	Total
1973	12	6	30	310	68	41	11	478
1972	13	1	12	256	179	26	3	490
1971	30	15	36	408	168	162	10	829
1970	13	12	28	130	132	7	10	332
1969	19	5	10	40	21	-	-	95
5 YR. AV.	17	8	23	229	114	47	7	445

Appendix 5

A - Amphibians and Reptiles Common to the Area

Amphibians

Great Basin spadefoot	Scaphiopus intermontanus
Western toad	Bufo boreas boreas
Pacific tree toad	Hyla regilla
Leopard frog	Rana pipiens brachycephala
Bullfrog	Rana catesbeiana
Nevada spotted frog	Rana prefiosa luteiventris

Reptiles

Western collared lizard	Crotaphytus collaris
Leopard lizard	Crotaphytus wislizenii
Sagebrush lizard	Sceloporus graciosus
Great Basin brown-shouldered lizard	Uta stansburiana
Northern grid-iron tailed lizard	Callisaurus draconoides myurus
Northern desert scaly lizard	Sceloporus magister uniformis
Great Basin fence lizard	Sceloporus occidentalis longines
Northern Great Basin horned lizard	Phrynosoma phatyrhinos
Great Basin blue-tailed skink	Eumeces skiltonianus utahensis
Great Basin whiptail lizard	Cnemidophorus tigris
Great Basin yellow-bellied lizard	Coluber constrictor
Great Basin striped racer	Masticophis taeniatus
Great Basin gopher snake	Pituophis catenifer
Western Long-nosed snake	Tinocheilus lecontei lecontei
Western Red-sided garter snake	Thamnophis sirtalis fitchi
Wandering garter snake	Thamnophis elegans vagrans
Bicolored ground snake	Sonora semiannulata
Great Basin night snake	Hypsiglena torquata deserticola
Great Basin rubber snake	Charina bottae utahensis
Red racer	Masticophis flagellum
Mojave Desert patch-nosed snake	Salvadora hexalpis
Great Basin rattlesnake	Crotalus viridis

B - AREA FISHERIES

Humboldt River below Rye Patch Dam

Trout, Whitefish and Grayling - Salmonidae

Rainbow trout - Salmo gairdneri
Brown trout - Salmo trutta

Catfish - Ictaluridae

Black bullhead - Ictalurus melas
Brown bullhead - Ictalurus nebulosus
Channel catfish - Ictalurus punctatus

Basses - Serranidae

White bass - Roccus chrysops

Sunfishes - Centrarchide

Sacramento perch - Archoplites interruptus
Green sunfish - Lepomis cyanellus
Bluegill - Lepomis macrochirus
Largemouth bass - Micropterus salmoides
White crappie - Pomoxis annularis

Perches - Percidae

Yellow perch - Perca flavescens
Walleye - Stizostedion vitreum

Minnows and Carp - Cyrinidae

Carp - Cyrinus carpio
Tui chub - Siphateles bicolor obesus
Goldfish - Carrasius auratus
Redside shiner - Richardsonius egregius
Speckled dace - Rhinichthys osculus

Fernley Wildlife Management Area

Pikes - Esocidae

Northern pike - Esox lucius

Catfish - Ictaluridae

Brown bullhead - Ictalurus nebulosus

Sunfishes - Centrarchidae

Sacramento perch - Archoplites interruptus
Bluegill - Lepomis macrochirus
Largemouth bass - Micropterus salmoides
White crappie - Pomoxis annualris

Minnows and Carp - Cyprinidae

Carp - Cyprinus carpio
Speckled dace - Rhinichthys osculus

Stillwater Wildlife Management Area

Trout, Whitefish and Grayling - Salmonidae

Rainbow trout - Salmo gairdneri
German brown trout - Salmo nutta

Catfish - Ictaluridae

White catfish - Ictalurus catus
Black bullhead - Ictalurus melas
Brown bullhead - Ictalurus nebulosus
Channel catfish - Ictalurus punctatus

Basses - Serranidae

White bass - Roccus chrysops

Sunfishes - Centrarchidae

Sacramento perch - Archoplites interruptus
Green sunfish - Lepomis cyanellus
Bluegill - Lepomis macrochirus
Largemouth bass - Micropterus salmonoides
White crappie - Pomoxis annularis

Perches - Percidae

Yellow perch - Perca flavescens

Minnows and Carp - Cyprinidae

Carp - Cyprinus carpio
Redside shiner - Richardsonius agregius (Balteatus)
Tui chub - Siphateles bicolor obesus
Sacramento black fish - Orthodon microlepidotus

Livebearers - Poeciliidae

Mosquitofish - Gambusia affinis

Truckee River

Trout, Whitefish and Grayling - Salmonidae

Mountain whitefish - Prosopium williamsoni
Cutthroat trout - Salmo clarki
Rainbow trout - Salmo gairdneri
Brown trout - Salmo Trutta

Minnows and Carp - Cyprinidae

Carp - Cyprinius carpio
Speckled dace - Rhinichthys osculus
Redside shiner - Richardsonius agregius

Suckers - Catostomidae

Tahoe sucker - Catostomus tahoensis
Cui-ui - Chasmistes cujus

Catfishes - Ictaluridae

Black bullhead - Ictalurus melas
Channel catfish - Ictalurus punctatus

Livebearers - Poeciliidae

Mosquitofish - Gambusia affinis

Sunfishes - Centrarchidae

Sacramento perch - Archoplites interruptus
Green sunfish - Lepomis cyanellus
Largemouth bass - Micropterus salmoides
White crappie - Pomoxis annularis

Sculpins - Cottidae

Piute sculpin - Cottus beldingi

Fishes and Fisheries of Nevada by Ira LaRivers, 1962
Nevada State Fish & Game Commission pp. 143-144

Original Fish Fauna of Pyramid Lake within Historical Times

A. Salmon & Trout Family, Family Salmonidae
1. Lahontan cutthroat trout - Salmo clarki henshawi
2. Pyramid rainbow trout - Salmo gairdneri smargdus

B. Sucker Family Family Catostomidae
3. Tahoe sucker - Catostomus tahoensis
4. Cui-ui lakesucker - Chasmistes cujus

C. Carp & Minnow Family, Family Cyprinidae
5. Lahontan redshiner - Richardsonius egregius
6. Lahontan tui chub - Siphateles bicolor obesus
7. Lahontan speckle dace - Rhinichthys osculus robustus

Fishes introduced into Pyramid Lake

A. Salmon & Trout Family, Family Salmonidae
1. Kokanee red salmon - Oncorhynchus nerka kennerlyi
2. Brown trout - Salmo trutta
3. Rainbow trout - Salmo gairdneri
4. Cutthroat trout - Salmo clarki
5. Bowcut nybrid
6. Silver salmon

B. Carp & Minnow Family, Family Cyprinidae
7. Asiatic carp - Cyprinus carpio

C. Catfish Family - Family Ictaluridae
8. Channel catfish - Ictalurus punctatus
9. Brown bullhead - Ictalurus nebulosus

D. Sunfish Family, Family Centrarchidae
10. Sacramento perch - Archoplites interruptus

A - Visual Management

PURPOSE

The intent of this study is to serve as a creditable and meaningful evaluation of the visual resource for a large area of land generally located between Reno and Oreana, Nevada along and extending for several miles on either side of Interstate 80. The subject area is currently under consideration by Sierra Pacific Power Co. for location of a 230 KV power transmission line.

EVALUATION PROCESS

The process utilized in this analysis has been recently developed by the Bureau of Land Management. A complete explanation of the procedure with examples of various phases appears in BLM Manual 6300 - Visual Resource Management. The overall objective is to provide a Bureau-wide systematic approach for identifying scenery quality and setting minimum quality standards for management of the visual resource values on national resource lands through a process which classifies all national resource lands into one of five visual resource management classes. Each of these classes contains a specific management objective for maintaining or enhancing the visual resource values. The visual management class assigned to a given land area depends upon three factors:

1. The inherent quality of the scenery being viewed.
2. The visual sensitivity level of the type of visual use it receives.
3. The visual zone it is in.

These three factors are analyzed through a six-step process to form "Visual Management Units". These six steps are briefly:

1. Determine and delineate "Scenic Quality".
2. Determine the visual sensitivity level of each land area.
3. Identify and delineate "Visual Zones" (the foreground-middleground and background areas seen from travel routes or use areas.)
4. Delineate and label all areas where the combination of all three of the above factors are similar.
5. Assign a visual resource management class to each area.
6. Combine all contiguous areas of similar visual quality objective class to form Visual Management Units.

Scenic Quality

This process assigns a rating of : A - High Scenic Quality, B - Moderate Scenic Quality, or C - Low Scenic Quality to all lands within a given area, not just those administered by BLM. The procedure analyzes six key factors: land form, color, water, vegetation, uniqueness, and intrusions. Each of these factors is rated against a set of general criteria and a score assigned accordingly. When the evaluation is complete on a given land unit, the individual key factor scores are totaled and the Letter Rating A, B or C is assigned, depending upon the total points received.

The following evaluation sheet for scenic quality explains the criteria and scoring in more detail.

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Quality Evaluation Chart

SCENERY

KEY FACTORS	RATING CRITERIA AND SCORE		
① LAND FORM	Vertical or near vertical cliffs, spires, highly eroded formations, massive rock outcrops, severe surface variation. 4	Steep canyon walls, mesas, interesting erosional patterns, variety in size & shape of land forms. 2	Rolling hills, foothills, flat valley bottoms. 1
② COLOR	Rich color combinations variety or vivid contrasts in the color of soil, rocks, vegetation or water. 4	Some variety in colors and contrast of the soil, rocks & vegetation, but not dominant. 2	Subtle color variations, little contrast, generally muted tones. Nothing really eye-catching. 1
③ WATER	Still, chance for reflections or cascading white water, a dominant factor in the landscape. 4	Moving and in view or still but not dominant. 2	Absent or present but seldom seen. 1
④ VEGETATION	A harmonious variation in form, texture, pattern, and type. 4	Some variation in pattern and texture, but only one or two major types. 2	Little or no variation, contrast lacking. 1
⑤ UNIQUENESS	One of a kind or very rare within region. 6	Unusual but similar to others within the region. 2	Interesting in its setting, but fairly common within the region. 1
⑥ INTRUSIONS	Free from aesthetically undesirable or discordant sights and influences. 2	Scenic quality is somewhat depreciated by inharmoneous intrusions but not so extensive that the scenic qualities are entirely negated. 1	Intrusions are so extensive that scenic qualities are for the most part nullified. -4

A = 15-24   B = 10-14   C = 1-9

EXPLANATION OF RATING CRITERIA

① Land Form or topography becomes more interesting as it gets steeper and more massive. Examples of outstanding land forms are found in Grand Canyon, the Sawtooth Mountain Range in Idaho, the Wrangle Mountain Range in Alaska, Rocky Mountain National Park, etc.

② Color. Consider the overall color of the basic components of the landscape (i.e., soil, rocks, vegetation, etc.) as they appear during the high use season. Key factors to consider in rating "color" are variety, contrast, and harmony.

③ Water is that ingredient which adds movement or serenity to a scene. The degree to which water dominates the scene is the primary consideration in selecting the rating score.

④ Vegetation. Give primary consideration to the variety of patterns, forms, and texture created by the vegetation.

⑤ Uniqueness. This factor provides an opportunity to give added importance to one or all of the scenic features that appear to be relatively unique within any one physiographic region. There may also be cases where a separate evaluation of each of the key factors does not give a true picture of the overall scenic quality of an area. Often it is a number of not so spectacular elements in the proper combination that produces the most pleasing scenery -- the uniqueness factor can be used to recognize this type of area and give it the added emphasis it needs.

⑥ Intrusions. Consider the impact of man-made improvements on the aesthetic quality. These intrusions can have a positive or negative aesthetic impact. Rate accordingly.

INSTRUCTIONS (See Sec. .1 for general procedures)

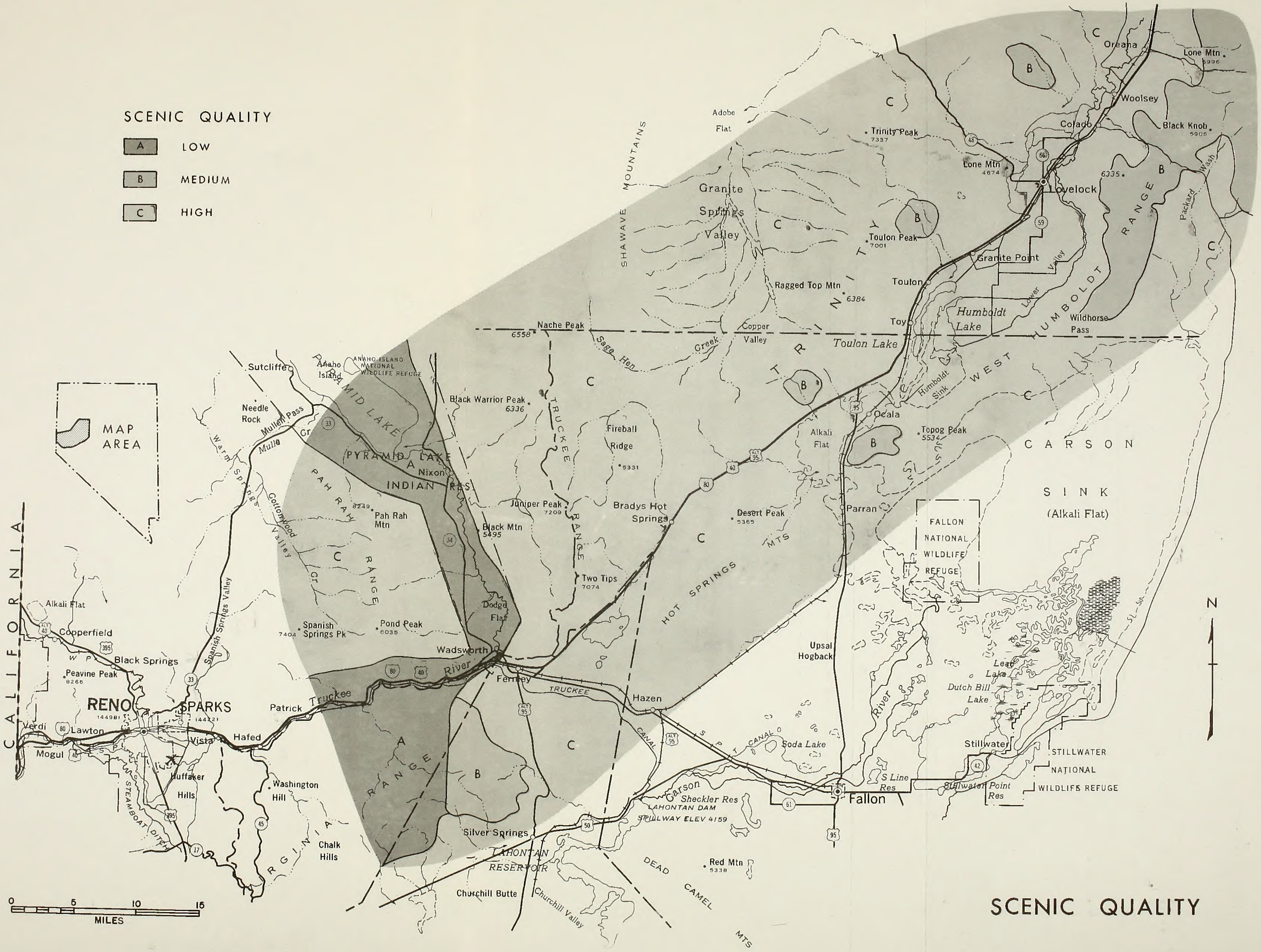
Purpose: To rate the aesthetic quality of the scenic resource on all BLM lands.

How to Identify Scenery Value: All Bureau lands have scenic value.

How to Determine Minimum Suitability: All BLM lands are rated for scenic values. Also rate adjacent or intermingling non-BLM lands.

How to Delineate Rating Areas: Consider the following factors when delineating rating areas:

1. Like physiographic characteristics (i.e., land form, vegetation, etc.
2. Similar visual patterns, texture, color, variety, etc.
3. Areas which have a similar impact from intrusions (i.e., roads, structures, mining operations, or other surface disturbances).



SCENIC QUALITY

The majority of the study area is rated 'C'. There are three isolated 'B' rated areas in the Trinity Mountains. The Rye Patch Dam area is also rated 'B'. The Seven Troughs, Lava Beds, and Selenites are 'B' ratings, just north of the study area.

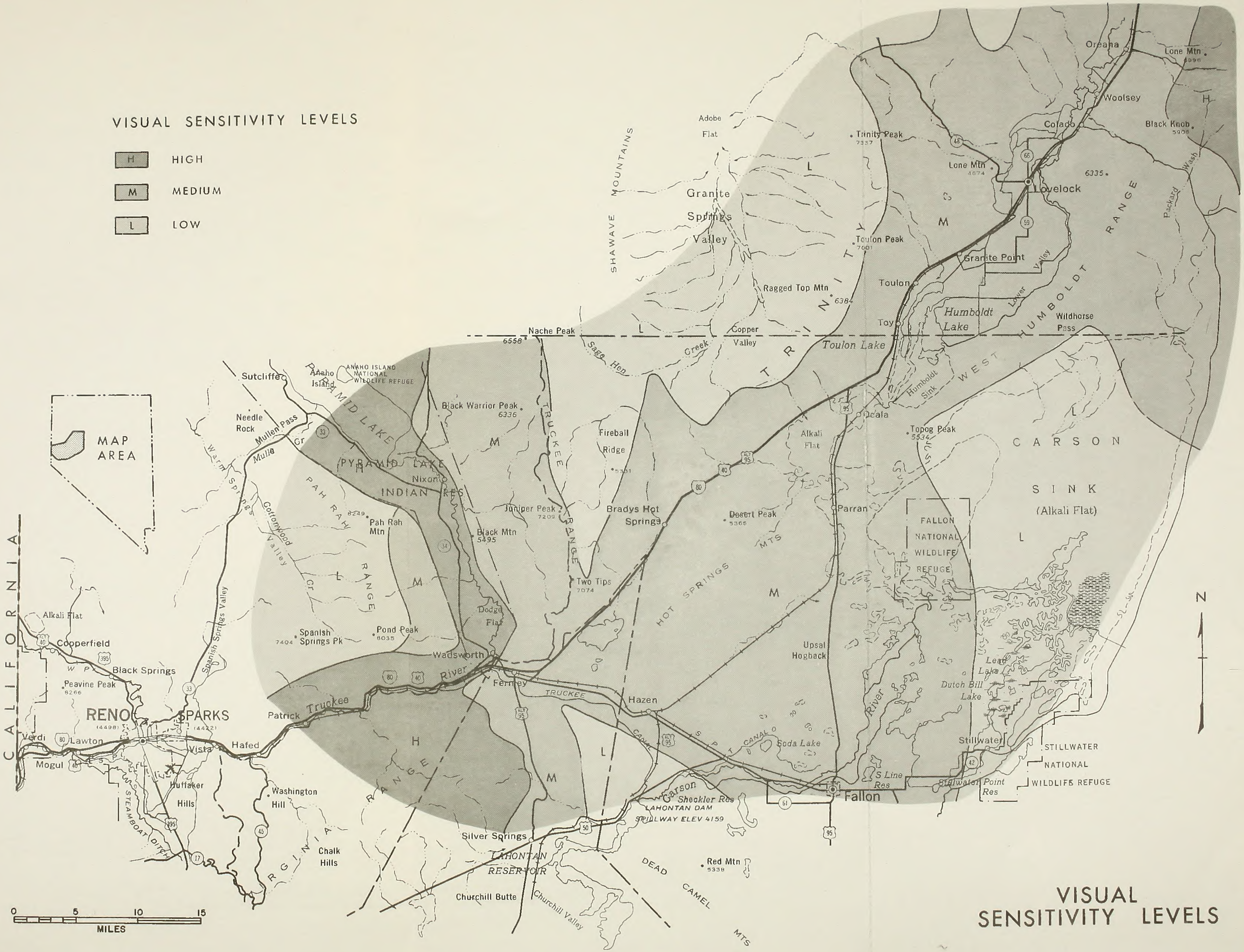
A large 'A' rated area has also been identified. It includes the Pyramid Lake area extending south to the Truckee River Canyon and Including the Virginia Range. These are noted on the following map: Scenic Quality.

Visual Sensitivity Level

The next process in the evaluation is determination of the visual sensitivity levels. This basically is an indicator of people's concern of the relative importance or value of visual response to an area in relation to other areas within a given boundary. One of the most important aspects of this procedure is criteria selection. Four criteria were selected as being valid and meaningful in terms of analyzing sensitivity levels in this area. They are: (1) Use volumes of highway and transportation routes; (2) Use volume of trails, river, and water bodies; (3) Use association, primitive areas, observation sites, recreation areas, etc., and (4) Other agency use and planning attitudes. These criteria and evaluation factors for determining what category they fall into: High, Medium, or Low, are found in the following table.

Criteria for Determining Sensitivity Level

Criteria	High	Medium	Low
Use Volume (Total use, no distinction between types, cars and trains)	More than 200 vehicles per day	20-200 vehicles per day	Less than 20 vehicles per day
Use Volume Trails, River, Water bodies	20,000 or more visits per year	2,000-20,000 visits per year	Less than 2,000 visits per year
Use Association Primitive areas, observation sites, recreation areas	Major	Secondary	Minor
Other Agency Use and planning attitudes	Major national or regional in scope	Secondary sub-region or state	Minor local



VISUAL SENSITIVITY LEVELS

Use volume from Highway 80, 95, Alternate 95 and Amtrak record high travel use. Highway 34 from Interstate 80 to Nixon is also high travel use; however, it drops to medium from Nixon to Gerlach. Other medium travel use is recorded on Highway 48 and 66 to Eagle Picher Mine and Iron Mine. All other roads show low use.

Use volume for trails, rivers and water bodies are all low in the area, with expections at Rye Patch Dam, Truckee River, and Pyramid Lake that have high use. No medium use is recorded within this criteria.

Observation sites, primitive camps and recreation areas are most normally associated with mountain peaks and canyons within the subject area. The use associated with these areas is considered secondary to minor in the majority of the study area. The use is major at Rye Patch Dam, Pyramid Lake and road-side rest stops.

Other agency use and planning attitudes considerations were limited to evaluating the relative values of the several wildlife refuges and management areas in the overall area. These were generally found to be in the medium or low sensitivity level category. This phase of the evaluation is delineated on the following map: Visual Sensitivity Levels.

Visual Zones

The final major step in the process is determination of the visual zones. These zones, which identify visible areas from key observation points (highway, well traveled roads, overlooks, recreation sites, etc.), are classified into three units:

Foreground-Middleground Zone:

Foreground-middleground is described as the area visible from a travel route or sensitivity area for a distance of 3 to 5 miles where management activities might be viewed in detail. The other boundary of this zone is defined as the point where the texture and form of individual plants are no longer apparent in the landscape.

Background:

Background is described as the area of a visual zone which lies beyond the foreground-middleground usually from a minimum of 3 to 5 miles to a maximum of about 15 miles from a travel route or use area. Atmospheric conditions in some areas may limit the maximum to about 8 miles or increase it beyond 15 miles.

Seldom Seen:

All areas not identified in the two previous zones are considered to be in the Seldom Seen Zone. Generally, these are areas seen from low use transportation routes or are beyond the 15-mile background zone for other routes.

Assigning a Visual Resource Management Class

Following the identification and delineation of the three previous evaluation factors, all areas of common characteristics were mapped and labeled.

Utilizing the following matrix, a visual resource management class was then assigned to each of the units with common characteristics. For example: all areas in Class B Scenery, High Sensitivity Level and the background visual zone would be in the III visual resource management class.

In this study, three visual resource management classes were identified. Each of these classes describes a visual resource value in terms of Highly Significant, Moderately Significant, or Significant and the different degrees of modification allowed in the basic elements of the landscape. They are:

Class II - Highly Significant

Changes in any of the basic elements (form, line, color or texture) caused by a management activity should not be evident in the characteristic landscape.

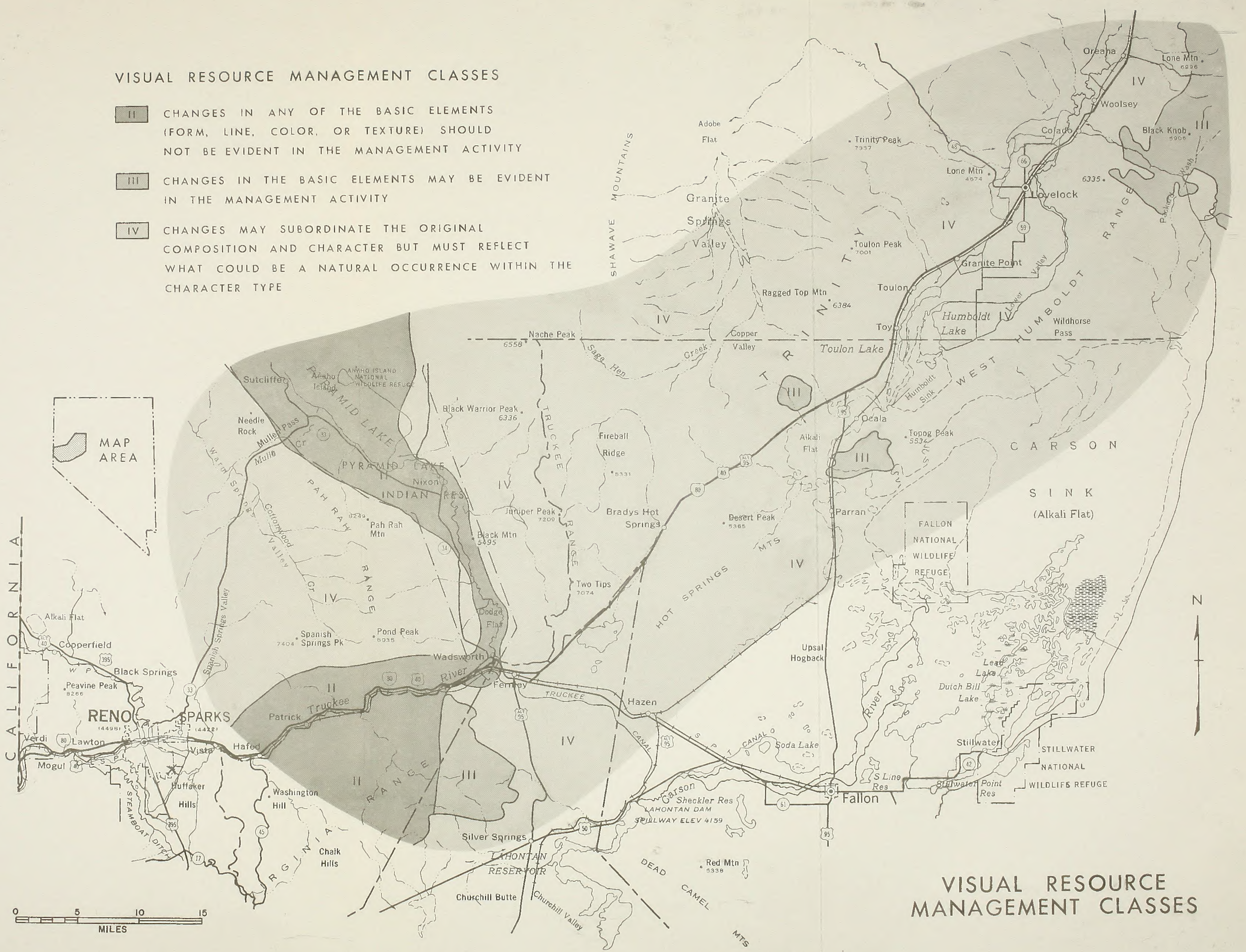
Class III - Moderately Significant

Changes in the basic elements (form, line, color, texture) caused by a management activity may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.

Class IV - Significant

Changes may subordinate the original composition and character but must reflect what could be a natural occurrence within the characteristic landscape.

The Visual Resource Management Classes are delineated on the following map.



VISUAL RESOURCE MANAGEMENT CLASSES

II — CHANGES IN ANY OF THE BASIC ELEMENTS (FORM, LINE, COLOR, OR TEXTURE) SHOULD NOT BE EVIDENT IN THE MANAGEMENT ACTIVITY

III — CHANGES IN THE BASIC ELEMENTS MAY BE EVIDENT IN THE MANAGEMENT ACTIVITY

IV — CHANGES MAY SUBORDINATE THE ORIGINAL COMPOSITION AND CHARACTER BUT MUST REFLECT WHAT COULD BE A NATURAL OCCURRENCE WITHIN THE CHARACTER TYPE

VISUAL RESOURCE MANAGEMENT CLASSES

VISUAL CONTRAST RATING

The BLM has also devised a visual resource contrast rating method to measure the impact of proposed activities to determine whether or not they meet the standards for each visual resource management class. A complete explanation of this system can be found in the 6320 section of the BLM Manual.

Briefly the system is based on the premise that the degree to which a management activity adversely impacts the visual quality of the landscape depends upon the amount of visual contrast that is created between the activity and the existing landscape character. The amount of contrast between a proposed activity and the existing landscape character can be measured by separating the landscape into its major features (land and water surface, vegetation, and structures), and then predicting the magnitude of change in contrast of each of the basic elements (form, line, color, and texture) to each of the features. Assessing the amount of contrast for a proposed activity in this manner can give a good indication of the severity of impact and serve as a guide in determining what is required to reduce the contrast to the point where it will meet the visual resource management classes for the area.

Use of the Contrast Rating. The contrast rating must be applied in the planning stages to all proposed land management activities that will disturb the soil, change or remove vegetation, or place a structure in the landscape. It should also be applied to all areas that are identified as needing rehabilitation or enhancement. Application of the contrast rating system should be done from the most critical view

point or points that are or will be commonly in use. When applying the rating system, keep in mind the following variables are the factors which determine how well the contrast is seen:

- Distance from which the project will be viewed.

- Angle of observation. The apparent size of a management activity is directly related to the angle between the viewers line-of-sight and the slope being viewed. As this angle nears 90°, the maximum area is viewable and becomes most critical.

- Length of time the project is in view. If the viewer has only a brief glimpse of the project, the constrast can almost be disregarded. If, however, the project is subject to view for a long period, as from an overlook, the opportunity to detect contrast becomes very critical.

- Relative size or scale of the project in relation to its surroundings.

- Season of the year and the effects of seasonal changes. Contrast rating should be done considering the heavy or most critical use season.

- Light and how it will effect the project being viewed.

- The effect time has on the healing process. Few projects can be expected to meet the visual classes immediately upon completion. With some long-term projects, such as a strip mine, it may be desirable to have both short-term (5 years) and long-term objectives (completion of the project).

Contrast Rating as a Measure of Meeting Established Visual Resource Management Classes. The following is applied to determine if the proposed activity will meet the visual resource management class

assigned to the area.

Class I. The contrast rating for any one element may not exceed 1 (weak) and the total contrast rating for any feature must be less than 10.

Class II. The contrast rating for any one element should not exceed 2 (moderate) and the total contrast rating for any feature may not exceed 10.

Class III. The contrast rating for any one element should not exceed 2 (moderate) and the total contrast rating for any feature may not exceed 16.

Class IV. The total contrast rating for any feature should not exceed 20.

Class V is an interim classification for rehabilitation or enhancement of an area. Based upon its indicated potential visual resource management class (II, III, or IV), select the appropriate contrast rating.

Contrast Rating as a Guide to Reducing Visual Impact. The contrast rating quickly points out the elements and the features that will cause the greatest visual impact. This provides a guide to the most effective method of reducing the visual impact of a proposed activity or project. Those elements with the highest contrast rating are the ones that can be attacked and lowered most effectively.

Visual Contrast Rating Methodology. The visual contrast created by a management activity can be measured by determining the contrast caused by that activity in each of the basic elements.

Assigning Numerical Values. The ease of detecting contrast in the

basic elements varies on a scale from 4 (form) to 1 (texture). By assigning values that indicate degree of contrast, 3 for strong, 2 for moderate, and 1 for weak, we can set up a direct multiplier for an indication of the strength of the contrast.

Elements

Form - 4
Line - 3
Color - 2
Texture - 1

Degree of Contrast

Strong - 3
Moderate - 2
Weak - 1
None - 0

Visual Contrast Application

Landscape Description. Write a brief description of the existing landscape. Describe each of the landscape features (land form, vegetation, structures) in terms of the basic elements (form, line, color, texture.)

Activity Description. Briefly describe and define the proposed activity or project. Tell how it will be accomplished and the anticipated impacts on the landscape by feature and element.

Contrast Rating. Using the methodology described above, determine a contrast rating for the proposed activity. If the activity does not meet the requirements for the VRM Class that has been established for

the area, look at the rating scores and see what can be done to reduce the impact more effectively, then redesign the project and run through the rating process again. If the proposed activity still will not meet the requirements of the VRM Class, a landscape architect should be called in to reassess the design. If the VRM Class requirements still cannot be met, a written recommendation by the landscape architect should be made to the District Manager to either go ahead with the proposal with the impacts reduced as much as possible, revise the proposal, or abandon the proposal in favor of the protection of the visual resource.

Feature Score. A total score for each feature (land surfaces, vegetation, or structures) of 1-10 indicates the contrast can be seen, but does not attract attention; 11-20 attracts attention--the contrast begins to dominate the characteristic landscape; 21-30 demands attention, will not be overlooked.

Contrast Rating Example. Following the visual contrast application, the contrast rating is applied to each of the types of features in the landscape separately. That is, a contrast rating is developed for the proposed change in land surface, for the vegetation, and for the structures. The ease of detection for each element is multiplied by the degree of contrast and the results are added to get a total score. The total score for all three types of feature is not as important as the score for each individual feature but it could give an indication of the overall magnitude of the impact. In long-term projects, such as strip mines, a short-term and long-term evaluation of (contrast rating) should be done.

	Element	Contrast	Score	Maximum Score Possible
Land Surface Features	Form - 4 X	None - 0	= 0	
	Line - 3 X	None - 0	= 0	
	Color - 2 X	Moderate - 2	= 4	
	Texture - 1 X	Moderate - 2	= 2	
		Sub Total	= 6	30
Vegetation Features	Form - 4 X	Strong - 3	= 12	
	Line - 3 X	Strong - 3	= 9	
	Color - 2 X	Moderate - 2	= 4	
	Texture - 1 X	Moderate - 2	= 2	
		Sub Total	= 27	30
Structures Features	Form - 4 X	Moderate - 2	= 8	
	Line - 3 X	Weak - 1	= 3	
	Color - 2 X	Weak - 1	= 2	
	Texture - 1 X	Moderate - 2	= 2	
		Sub Total	= 15	30
			48	90

The overall score (48) indicates a moderate impact. The vegetation contrast (27) is extreme, thus, the project would be very obvious. The most effective place to reduce contrast is in the form and line elements of vegetation, and the element of form in structures.

B - Summary Archaeological Findings

	Base Camps		26WA2007
			26WA2008
		Semi-Permanent	26PE313
			26PE315
			26PE317
			26PE318
			26PE321
		Transitory	26PE316
	Trail Camp		26WA2003
	Temporary Campsite		26CH182
	Task Sites		26WA2005
			26WA2006
			26WA001
			26WA004
			26WA005
			26WA006
			26WA008
			26WA0011
			26WA0012
			26CH001
			26CH002
			26CH007
			26PE319
			26PE312
			26PE314
			26PE320
			26PE345
			26PE310
			26PE001
			26PE003
	Possible Task Site		26CH181
	Rockshelter, Overhang Cave		26WA2004
			26PE343
			26PE344
Unclassified			
	Possible Quarries		26CH183
			26CH008
Paleoecological			
	Petrified Wood		26PE0014 (P)
			579-P-123
Historic			
	General		26WA002
			26WA003
			26WA009
			26WA0010
			26WA0013
	Mining		26CH184
			26PE342

C - Archaeological Regions

REGION I

Sites along the right-of-way in Region I include semi-permanent base camps for consumption of stored food or exploitation of Truckee River fishery (2); trail camp site (1); small and very small task sites predominantly for hunting or flake tool manufacture (9); moderately extensive historic components associated with prehistoric sites (2); very small historic sites (5). Historic occupation of the area is represented by transportation and communication rights-of-way, ranching and mining sites and the recorded small sites, most of which represent temporary camp or trail sites of ranchers, miners or hunters. One rockshelter near but not crossed by the proposed line is unclassified because no evidence was observed to permit its assignment to even a general time period. Burned bones of domestic sheep may have been brought to the site by predators and burned in a naturally caused fire.

Sites crossed by the line represent most of the major kinds of human activities known to have taken place in the area over the past 100 years. No unique historic period (post 1844) sites were found, nor were any with exceptionally well preserved remains.

Prehistoric sites in the inventory similarly represent the major kinds of adaptive human activity which can be predicted on the basis of ethnographic and previous archaeologic research. On the basis of temporally diagnostic artifacts, at least three of these sites can probably be identified with the ancestors of the Northern Paiute people who have lived in this general area since the earliest white contact. These sites are historically significant, particularly in the light of recent tribal efforts to record their oral tradition including the location of

their historic sites (Rambaud et al 1974).

None of the sites crossed by the line in Region I are judged to meet the requirements for inclusion on the National Historic Site Registry, nor to be otherwise marked for special preservation. Their cultural values can best be realized by their contribution to interpretive exhibits or presentations over communication media.

The scientific significance of the inventory rests primarily on its place as an integral part of a series of statistically comparable linear transects across the Northern Great Basin, which permit general inferences about historic and prehistoric patterns of land-use throughout the area.

All but one of these sites were judged to be subject to unavoidable adverse impact by construction. Where appropriate observations and test excavations failed to reveal significant subsurface remains, complete systematic surface collections were made of all sites along the proposed right-of-way. One site, the possible rockshelter (26WA2004), is within view of the right-of-way and subject to possible indirect impact only. An existing access road is available for the line in the vicinity of the site.

REGION II

The site along the right-of-way in Region II includes three very small prehistoric task sites; two historic mining and habitation sites, a historic camp site, two paleoecological sites, a possible rock shelter and cave, two possible chert quarry areas, and a possible base camp or task site. Historic occupation is also evidenced by improved dirt roads and jeep trails, claim markers, mine tailings.

Sites in this sample suggest that however limited post-contact exploitation of the area might be, it is still somewhat more intensive than prehistoric exploitation.

The Ragged Top Mine site and the two paleoecological sites have considerable scientific and/or historical values.

The prehistoric task sites are small and their significance is largely due to the record they bear of various tasks. Without the small task sites, the full range of adaptive behavior of the hunter-gatherers who lived here would never be understood.

REGION III

Sites subject to direct impact include three of the Humboldt River base camps (26PE313, 26PE318, 26PE321) and five of the prehistoric task sites (26PE320, 26PE345, 26PE310, 26PE001, 26PE003). Sites indirectly impacted include three base camps (26PE315, 26PE317, 26PE316) and three task sites on the river (26PE319, 26PE312, 26PE314).

Two the these sites have relatively large historic components associated with ranching, railroad, and telegraph lines.

One of the Humboldt River base camps is probably assignable to the ancestors of Northern Paiute people still occupying the area and of significance to their current efforts to record their historic sites.

None of the sites along the Humboldt subject to direct impact appear to have subsurface remains. This is in large part due to the right-of-way location along an existing power line and access road which have partially obliterated traces of earlier human activity.

As in other regions, cultural potential of these sites can best be realized by interpretation to the public through exhibits, printed material, or media presentation.

The scientific significance of this transect is heightened by the fact that it crosses the Humboldt River in the Northern Paiute territory downstream from the historic boundary with Western Shoshone.

Many of the sites have been disturbed by post-contact activity, but fewer historic sites as such were recorded here than elsewhere along the line. Historic use of the area has been predominantly ranching and transportation - communication routes. The proposed line crosses major highways, railroads (Southern Pacific and Western Pacific) telegraph, telephone, and power lines. It parallels an earlier 120 KV transmission line across the river to the Oreana substation. South of the substation the line crosses the historic Nevada Short Line Railroad route that joined the Rochester mining district to the mill at Oreana.

D. - Inventoried Archaeological and Historical Sites and Trails

Map Key	Archaeological Sites *
1	Old Standard Mine Aboriginal Campsite
2	26Pe-76 (campsite)
3	26Pe-77 (campsite)
4	Echo Canyon Campsites
5	Rye Patch Dam Campsites
6	Rocky Canyon Campsites
7	26Pe-333 (campsite)
8	26Hu-40 (rockshelter), 26Hu-41 (campsite)
9	Sacramento Canyon Sites (campsites and aboriginal hunting area with rock alignments)
10	26Pe-316, 26Pe-318, 26Pe-319, 26Pe-320, 26Pe-321, 26Pe-345 (campsites)
11	26Pe-313, 26Pe-317 (campsites)
12	26Pe-314, 26Pe-315 (campsites)
13	26Pe-311 (campsite)
14	26Pe-329, 26Pe-330 (campsites)
15	26Pe-349, 26Pe-348 (campsites)
16	26Pe-350 (campsite)
17	26Pe-351 (campsite: possibly very important as a recent discovery of corn here may demonstrate that some horticulture was practiced by the aboriginal population, and if so, this would be significant discovery)
18	26Pe-16, 26Pe-17 (campsite with some historic components)
19	26Pe-300 (possible seasonal camp)
20	26Pe-26 (campsite with numerous large hammerstones)
21	26Pe-19 (campsite)
22	26Pe-20, 26Pe-21 (campsites)
23	26Pe-18 (surface site)
24	Humboldt River Campsite
25	26Pe-10 Pole Canyon Petroglyphs (two mounds in salt flats; eight burials were found)
26	26Pe-22, 26Pe-23, 26Pe-24 (campsites)
27	26Pe-11 (surface site with perforated wooden object)
28	Granite Point Sites (significant cave and open sites)
29	26Pe-302 (possible historic Indian campsite)
30	Granite Point Early Man Site
31	Buena Vista Hills Early Man Locality (potential for National Register site in the Great Basin; should be assessed immediately for deletion status)
32	Ragged Top Mountain Rockshelters
33	26Ch-37 (campsite)
34	Locality with many campsites
35	26Pe-106 (campsite)
36	Leonard Rockshelter and Open Sites (National Register Property)

Archaeological Sites *

Map Key	
37	Lovelock Cave and Lovelock Lake Bed Sites (Lovelock Cave is considered by many archaeologists to have been the single most important site ever excavated in Nevada)
38	Ocala Cave (identified for nomination to National Register in State Historic Preservation Plan)
39	Humboldt Cave and Cocanour Sites (Humboldt Cave has been nominated to the National Register by the BLM)
40	Early Man Site
41	Winnemucca Lake South End Rock Art Site
42	Winnemucca Lake Caves (number of significant caves)
43	Mount Limbo Rock Art Site
44	Jenny Creek Rock Art Site

Historical Sites *

1	Farrell (early day mining)
2	Mazuma (early day mining)
3	Seven Troughs (early day mining)
4	Vernon (early day mining)
5	Rye Patch Reservoir (covers the Lassen Meadows which is an early historic site)
6	Unionville (early day mining and early county seat for Humboldt County; an old school house with a museum still remains as a notable feature on State Historic Preservation Plan)
7	Rye Patch (early day mining and milling camp with mill foundations still existing on State Historic Preservation Plan)
8	Arabia (early day mining)
9	Etna (milling camp with foundations still existing; on State Historic Preservation Plan)
10	Oreana Station (station for the Nevada Short Line RR extending to Rochester; on State Historic Preservation Plan)
11	Lima (early day mining camp with stone ruins marking the site; on State Historic Preservation Plan)
12	Panama (early day mining with one cellar remaining)
13	Spring Valley (early day mining; also known as Fitting; placer dumps and mill ruins mark the site today)
14	American Canyon (mining area with Chinese influence; rubble exists today; on State Historic Preservation Plan)

Archaeological Sites *

Map Key	
15	Rochester (early day mining and station for the Nevada Short Line RR; Post Office and some structures remain; on State Historic Preservation Plan)
16	Packard (20th century mining with the Nevada Packard Mining Co., and a cyanide plant; the location and status should be checked)
17	Oreana (early day mining and milling with a few buildings and foundations remaining)
18	Spring City (early mining town; on State Historic Preservation Plan)
19	Lovelock (on State Historic Preservation Plan)
20	Jessup (early day mining)
21	Desert (early day mining)
22	Desert (early day mining)
23	Brady's Hot Springs (Emigrant Trail)
24	Nightingale (early day mining)
25	Old Mill (early day mining)

Historical Trails *

1	Beckwith Trail (1855 Pacific RR surveys)
2	Emigrant's Trail (Humboldt River approach)
3	Stevens-Donner Route (Truckee-Donner Route)
4	Mormon-Carson Route (Carson River-Walker River Route)

Explorer Routes *

1	Fremont
2	Peter Ogden Expedition (re-entry spring 1829)
	Joseph Walker Expeditions (Humboldt River)

Historic Railroads *

1	Nevada Short Line Railroad (mining)
2	Eagle Salt Works to Short Line Railroad

* The above listing, especially with respect to archaeological sites, is far from being complete. It only indicates the approximate locations of known value that are believed to be of significance. There are in all probability many more values of significance to be found in the subject area.

The preceding listing and accompanying map (map II-11) should only be used as a general guide to alert the reader that at least in given areas significant archaeological and historical values do exist.

APPENDIX 7

Ability of Various Land Uses to Accommodate Utility Lines

LAND USE	CONSIDERATIONS AND PROBLEMS	PROBLEM SOLUTIONS
Agricultural (crops, grazing, rangeland, timber, orchards)	Soil compaction and reduction of fertility for crop production. Hazards to livestock from accidentally ingesting scraps left from construction. Livestock may use towers as scratching posts, damaging the soil in thin crusted areas. Interruption of farming activities during construction and maintenance.	Avoid cropland in favor of pastures, rangeland; in particular, avoid irrigated cropland. Ensure complete cleanup after construction.
Extractive Industries (mining, quarrying, etc.)	Interference with operation required for extraction, hauling, preprocessing. Possibility that extraction may undermine soil creating instability for structures and that heavy machinery can rupture pipelings, destroy tower footings.	Route line to avoid close proximity to extraction and supporting operations including hauling, delivery of supplies, etc.
Recreational	Intrusion into hunting area can disturb game, be accompanied by restrictions on hunting activity. Construction activity can damage wetlands, degrade water quality, interfere with fishing. In areas of intensive recreational activity, massive structures can appear as intrusions into limited space available. Possible hazards, especially from transmission lines, in playgrounds or other areas where metal objects are prominent.	Clear so as to provide open space adjacent to wooded areas for wildlife nesting and breeding. Avoid cutting across wildlife migration paths or disturbing breeding areas. Avoid wetlands, any especially sensitive ecological areas. try to span small recreational areas as much as possible; locate necessary structures unobtrusively.

(Continued)

LAND USE	CONSIDERATIONS AND PROBLEMS	PROBLEM SOLUTIONS
Conservation	Disruption of ecology; disturbance of wildlife, hazard to rare and endangered species. Esthetic impact of intrusion in wilderness areas.	Avoid ecologically fragile areas; avoid habitats, especially nesting and breeding grounds, of rare or endangered species; follow clearing practices that provide combination of open and wooded spaces to favor wildlife. Reduce visibility of ROW and structures by selective cutting, use of vegetation and topography for screening, simple unobtrusive structural design. Limit use of access roads by off-the-road vehicles.
Transportation and Service	Federal Highway Administration restrictions on use of Interstate Route ROW. Increased visible exposure of overhead structures adjacent to frequently traveled highway. Electrical interference with railway communications signaling equipment, hazard of inductance in rails; costly shielding requirements. Circuitous route imposed on utility line in following transportation ROW in hilly terrain. Interference of transmission towers with and hazard from aircraft near airfield. Possible interference with or hazard to traffic during construction.	Follow esthetic guidelines to minimize visual intrusiveness and incompatibility of overhead structures especially transmission line. Provide shielding requirements if necessary to share railroad ROW. Select as far as possible less heavily traveled routes (highway, railroad) where frequency of observation, potential interference will be less. Avoid aircraft takeoff, landing, fly way areas.

(Continued)

APPENDIX 7 (continued)

LAND USE	CONSIDERATIONS AND PROBLEMS	PROBLEM SOLUTIONS
Undeveloped	Minimum impact on land usage but barren or lightly vegetated areas are easily eroded and scarred by construction.	Use helicopters where soil or ecology is fragile to minimize access roads and disturbance to surface.

Source: Resource and Land Investigations (RALI) Program: Considerations in Evaluating Utility Line Proposals; Prepared under contract for U. S. Dept. of the Interior, Bureau of Land Management, July 1975.

APPENDIX 8

MINERAL PRODUCTION STATISTICS BY COMMODITY, CHURCHILL COUNTY, 1970, 1980 AND 2000

Commodity and Unit	Number of Mines	Units of Product	Number Employed	Value at 1970 Prices (Amounts in Thousands)
Antimony, tungsten, sand and gravel, saline playa products 1970 total[a]	6		15	$ 346
Sand and gravel, tons	1	198,000	4	$ 198
Geothermal power, MWH	1	80,000	15	400
Saline playa products, tons	1	50,000	50	10,000
1980 total	3		69	$10,598
Antimony, tons	1	1,000	12	$ 2,800
Diatomite, tons	1	20,000	84	600
Sand and gravel, tons	1	220,000	4	220
Geothermal power, MWH	2	480,000	45	2,400
Saline playa products, tons	1	100,000	100	20,000
2000 total	6		245	$26,020
Copper, tons	1	20,000	600	$23,200
Diatomite, tons	1	40,000	168	1,200
Sand and gravel, tons	1	243,000	5	243
Zeolites, tons	1	150,000	70	7,500
Geothermal power, MWH	2	640,000	60	3,200
Saline playa products, tons	2	150,000	150	30,000
2020 total	8		1,053	$65,343

[a] Statistics for individual items withheld to avoid disclosing confidential data.

Source: To be published planning report, Forecast for the Future, Mining, prepared by the State Engineers Office as part of the development of the State Water Plan.

APPENDIX 8

MINERAL PRODUCTION STATISTICS BY COMMODITY, PERSHING COUNTY, 1970, 1980 AND 2000

Commodity and Unit	Number of Mines	Units of Product	Number Employed	Value at 1970 Prices (Amounts in Thousands)
Antimony, copper, iron ore, stone, sand and gravel, mercury, tungsten, clay, diatomite				
1970 total[a]	25		323	$12,501
Copper, tons	1	5,000	290	$ 5,800
Gold and silver, tons ore	1	200,000	120	2,000
Iron ore, long tons	2	500,000	127	5,000
Tungsten, tons	1	650	130	4,550
Clay, tons	1	10,000	2	120
Diatomite, tons	1	30,000	126	900
Fluorspar, tons	1	40,000	40	2,000
Sand and gravel, tons	1	49,000	1	49
Stone, tons	3	305,000	100	915
1980 total	12		936	$21,334
Gold and silver, tons ore	1	200,000	120	$ 2,000
Iron ore, long tons	2	500,000	127	5,000
Mercury, flasks	1	10,000	114	4,200
Tungsten, tons	1	1,600	320	11,200
Clay, tons	1	20,000	4	240
Diatomite, tons	1	30,000	126	900
Fluorspar, tons	1	80,000	80	4,000
Sand and gravel, tons	1	60,000	1	60
Stone, tons	3	360,000	100	1,080
2000 total	12		992	$28,680
Antimony, tons	1	500	6	$ 1,400
Beryllium, tons	1	100	30	1,520
Copper, tons	1	10,000	280	11,600
Iron ore, long tons	2	1,000,000	253	10,000
Tungsten, tons	1	800	160	5,600
Clay, tons	1	20,000	4	240
Diatomite, tons	1	20,000	84	600
Fluorspar, tons	2	150,000	150	7,500
Sand and gravel, tons	1	49,000	1	49
Stone, tons	3	365,000	100	1,095
Total rock components, tons	1	500,000	65	10,000
2020 total	15		1,133	$49,604

[a] Statistics for individual items withheld to avoid disclosing confidential data.

Source: To be published planning report, *Forecast for the Future, Mining*, prepared by the State Engineers Office as part of the development of the State Water Plan.

APPENDIX 8

MINERAL PRODUCTION STATISTICS BY COMMODITY, LYON COUNTY, 1970, 1980 AND 2000

Commodity and Unit	Number of Mines	Units of Product	Number Employed	Value at 1970 Prices (Amounts in Thousands)
Copper, diatomite, sand and gravel, stone 1970 total[a]	5		520	$ 46,117
Copper, tons	1	50,000	999	$ 58,000
Diatomite, tons	1	10,000	42	300
Sand and gravel, tons	1	173,000	3	173
Stone, tons	1	400,000	100	1,200
1980 total	4		1,144	$ 59,673
Copper, tons	1	50,000	2,125	$ 58,000
Iron ore, long tons	2	1,500,000	269	15,000
Diatomite, tons	1	30,000	126	900
Sand and gravel, tons	1	220,000	4	220
Stone, tons	2	550,000	110	1,650
2000 total	7		2,634	$ 75,770
Copper, tons	2	70,000	2,725	$ 81,200
Iron ore, long tons	2	2,500,000	468	25,000
Diatomite, tons	1	50,000	210	1,500
Sand and gravel, tons	1	243,000	5	243
Stone, tons	2	600,000	120	1,800
2020 total	8		3,528	$109,743

[a] Statistics for individual items withheld to avoid disclosing confidential data.

Source: To be published planning report, Forecast for the Future, Mining, prepared by the State Engineers Office as part of the development of the State Water Plan.

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